STREET TREE

FACTSHEETS

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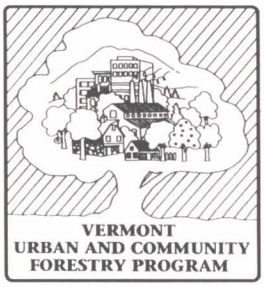
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STREET TREE
FACTSHEETS

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Q. robur Attention! . . . . . Qu ro At
Q. robur Fastigiate . . . . . Qu ro Fa
Q. robur Skymaster . . . . . Qu ro Sm
Q. robur Skyrocket . . . . . Qu ro Sr
Quercus rubra . . . . . Qu ru
Quercus shumardii . . . . . Qu sh
Sophora japonica . . . . . So ja
S. japonica Princeton Upright . . . . . So ja PU
S. japonica Regent . . . . . So ja Re
Sorbus . . . . . Sr
Syringa reticulata Ivory Silk . . . . . Sy rt IS
S. reticulata Regent . . . . . Sy rt Re
S. reticulata Summer Snow . . . . . Sy rt SS
Taxodium distichum . . . . . Ta di
Tilia americana Legend . . . . . Ti am Lg
T. americana Redmond . . . . . Ti am Rd
Tilia cordata . . . . . Ti co
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T. cordata Corinthian . . . . . Ti co Co
T. cordata Fairview . . . . . Ti co Fa
T. cordata Glenleven . . . . . Ti co Gl
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Z. serrata Village Green ..... Ze se VG

KEY TO INDEX OF TREE CHARACTERISTICS

SIZE, ADAPTATION, AND CULTURE			
1.	Height at maturity	■	Under 30'
		■	30' to 45'
		■	Over 45'
2.	Width of crown at maturity	↑	Less than 1/2 height
		↔	Equal to height or wider
3.	Hardiness in winter	3—9	Coldest USDA hardiness zone
4.	Sun or shade requirements	○	Requires full sun
		●	Tolerates sun or shade
		●	Prefers shade
5.	Soil acidity	A	Acid soil required
		N	Neutral or acid soil preferred
		W	Wide tolerance of acid to alkaline soils
6.	Soil drainage, compaction	□ ■ ■	High, medium, or low tolerance of compacted, droughty, or poorly drained soils
7.	Urban stress tolerance	⌂ ⌂ ⌂	High, medium, or low tolerance of salt, fumes, or other city stresses
8.	Transplanting	R	Recovery is slow after planting
		S	Spring planting recommended
POTENTIAL PROBLEMS AND ORNAMENTAL TRAITS			
9.	Nuisances	D	Debris from twigs, bark, or flowers
		F	Fruit or seeds troublesome
		L	Lawn problems
		M	Malodorous flowers or fruit
10.	Hazards	B	Breakage caused by storms
		P	Pipes clogged by roots
		S	Sidewalks heaved by roots
		T	Thorns can be injurious
11.	Diseases	◇ ◆ ◆	Light, seldom serious, or potentially severe damage caused by disease(s) in some years
12.	Insects	△ ▲ ▲	Light, seldom serious, or potentially severe damage caused by insects in some years
13.	Flower color	✱ ✱ ✱ ✱ ✿	Orange, pink, red, yellow, white flowers
14.	Fruit color	● ● ● ● ●	Blue, orange, purple, red, yellow fruit
15.	Foliage colorful	A	Autumn foliage is colorful
		G	Growing season foliage is colorful
		S	Spring foliage is colorful
16.	Features	B	Bark or branches are attractive
		F	Fragrance is pleasing
		L	Leaves are distinctive
		W	Winter silhouette or color is attractive

INDEX OF TREE CHARACTERISTICS

Height	Width	Hardiness	Sun/shade	Soil acidity	Soil drainage	Urban stress	Transplanting	Common name; *Scientific name* / Page code	Cultivar name	Nuisances	Hazards	Diseases	Insects	Flowers	Fruit	Foliage	Features
1	2	3	4	5	6	7	8			9	10	11	12	13	14	15	16
								Amelanchier—see Serviceberry									
								Ash, Green; *Fraxinus pennsylvanica*									
■		3	●	W	□	⌂		FxpaMS	Marshall Seedless	D	B	◆	▲			A	
■		3	●	W	□	⌂		FxpaPt	Patmore	D		◆	▲			A	
■		3	●	W	□	⌂		FxpaSm	Summit	D		◆	▲			A	
■		6	●	W	□	⌂		FxpaUr	Urbanite	D	B	◆	▲			A	
								Ash, White; *Fraxinus americana*									
■		5	●	N	■	⌂		FxamAA	Autumn Applause			◆	▲			A	
■		3	●	N	■	⌂		FxamAP	Autumn Purple			◆	▲			A	
■		5	●	N	■	⌂		FxamCC	Champaign County			◆	▲			A	
■		5	●	N	■	⌂		FxamRs	Rosehill			◆	▲				
■		4	●	N	■	⌂		FxamSk	Skyline			◆	▲			A	
								Baldcypress; *Taxodium distichum*									
■	↑	5	○	N	□	⌂	S	Tadi	several cultivars			◇	△			A	B
								Birch, Japanese white; *Betula platyphylla*									
■	↑	3	●	N	■	⌂	S	BepjWh	Whitespire			◆	▲			A	B
								Birch, River; *Betula nigra*									
■		4	●	N	□	⌂		BeniHr	Heritage			◆	▲				B
								Blackgum, Black Tupelo; *Nyssa sylvatica*									
■		5	●	A	■	⌂	S	Nysy	no cultivars			◆	▲		●	A	
								Cherry, Choke; *Prunus virginiana*									
■		3	○	N	■	⌂	S	PrviSh	Shubert, Canada Red			◆	▲	✿	●	G	
								Cherry, Oriental; *Prunus serrulata*									
■	↑	6	○	N	■	⌂	S	PrseAm	Amanogawa			◆	▲	✳			B
■		5	○	N	■	⌂	S	PrseKw	Kwanzan			◆	▲	✳			B
								Cherry, Sargent; *Prunus sargentii*									
■	↑	4	○	N	■	⌂	S	PrsaCo	Columnar			◇	▲	✳		A	B
■		5	○	N	■	⌂	S	PrxxAc	Accolade (hybrid)			◆	▲	✳			
								Coffeetree, Kentucky; *Gymnocladus dioicus*									
■		4	○	W	□	⌂	R	Gydi	no cultivars	F		◇	△			A	B
								Corktree, Amur; *Phellodendron amurense*									
■		4	●	W	■	⌂	R	PhamMa	Macho			◇	△			A	B
■	↔	3	●	W	■	⌂	R	PhamSh	Shademaster			◇	△			A	B
								Crabapple, Flowering; *Malus* species and hybrids									
■	↔	4	○	W	■	⌂		MlxxAd	Adams			◇	△	✳	●		
■		3	○	W	■	⌂		MlxxCe	Centurion			◇	△	✱	●		
■		4	○	W	■	⌂		MlxxHG	Harvest Gold			◇	△	✿	●		
■		4	○	W	■	⌂		MlxxMd	Madonna			◆	△	✿	●		
■		4	○	W	■	⌂		MlxxPr	Prairifire			◇	△	✳	●		
■		4	○	W	■	⌂		MlxxPS	Professor Sprenger			◇	△	✿	●		
■		4	○	W	■	⌂		MlxxRB	Red Barron			◆	△	✱	●	A	
■		4	○	W	■	⌂		MlxxRJ	Red Jewel			◆	△	✿	●		
■		4	○	W	■	⌂		MlxxSe	Sentinel			◆	△	✿	●		
■	↔	3	○	W	■	⌂		MlxxSn	Snowdrift			◆	△	✿	●		
■		3	○	W	■	⌂		MlxxSS	Spring Snow			◆	△	✿			
■		4	○	W	■	⌂		MlxxST	Sugar Tyme			◇	△	✿	●		
■	↔	4	○	W	■	⌂		MlxzCa	Zumi, Redbud			◆	△	✿	●		
1	2	3	4	5	6	7	8			9	10	11	12	13	14	15	16

1 Height	2 Width	3 Hardiness	4 Sun/shade	5 Soil acidity	6 Soil drainage	7 Urban stress	8 Transplanting	Common name; *Scientific name* / Page code	Cultivar name	9 Nuisances	10 Hazards	11 Diseases	12 Insects	13 Flowers	14 Fruit	15 Foliage	16 Features
								Cucumbertree—See Magnolia									
								Dogwood, Kousa; *Cornus kousa*									
	↔	5	●	N	■	▲	S	Cnku	many cultivars	F		◇	△	✿	●	A	B
								Elm, American; *Ulmus americana*									
	↔	2	●	W	□	⌂		Ulam	several cultivars		P	◆	▲				
								Elm, Lacebark or Chinese; *Ulmus parvifolia*									
		5	●	W	□	⌂		UlpaDy	Dynasty		P	◇	△			A	
		5	●	W	□	⌂		UlpaOh	Ohio		P	◇	△			A	
								Elm, Wilson's; *Ulmus wilsoniana*									
		4	●	W	□	⌂		UlwiPr	Prospector		P	◇	△			S	
								Elm, Hybrid; *Ulmus* hybrids									
		5	●	W	□	⌂		UlxxFr	Frontier		P	◇	▲				
		5	●	W	□	⌂		UlxxHo	Homestead		P	◇	▲				
	↔	5	●	W	□	⌂		UlxxPi	Pioneer		P	◇	▲				
		4	●	W	□	⌂		UlxxRe	Regal		P	◇	▲				
		4	●	W	□	⌂		UlxxSA	Sapporo Autumn Gold		P	◇	▲				
		4	●	W	□	⌂		UlxxUr	Urban		P	◆	▲				
								Filbert, Turkish; *Corylus colurna*									
		5	●	W	□	⌂	R	Coco	no cultivars	F		◇	△				B
								Ginkgo, Maidenhair Tree; *Ginkgo biloba*									
		4	●	W	□	⌂	R	GibiAG	Autumn Gold			◇	△			A	L
		4	●	W	□	⌂	R	GibiLk	Lakeview			◇	△			A	L
	↑	4	●	W	□	⌂	R	GibiPS	Princeton Sentry			◇	△			A	L
								Goldenrain Tree; *Koelreuteria paniculata*									
	↔	5	●	W	□	⌂	S	Kopn	cultivars rare			◆	▲	✱			
								Hackberry, Common; *Celtis occidentalis*									
	↔	4	●	W	□	⌂	R	CeocPP	Prairie Pride			◆	▲			A	B
								Hackberry, Sugar; *Celtis laevigata*									
		6	●	N	□	⌂	S	CelvAS	All Seasons			◇	▲			A	B
	↔	5	●	N	□	⌂	S	CexxMa	Magnifica (hybrid)			◆	▲			A	B
								Hardy Rubber Tree; *Eucommia ulmoides*									
	↔	5	●	W	□	⌂		Euul	no cultivars			◇	△				
								Hawthorn, Cockspur; *Crataegus crus-galli*									
	↔	4	○	W	□	⌂	S	Crcrin	Inermis	M		◆	▲	✿	●	A	
	↔	4	○	W	□	⌂	S	CrxxVn	Vaughn (hybrid)		T	◆	▲	✿	●	A	
								Hawthorn, Dotted; *Crataegus punctata*									
	↔	5	○	W	□	⌂	S	CrpnOP	Ohio Pioneer			◆	▲	✿	●		B
								Hawthorn, English; *Crataegus laevigata*									
		4	○	W	□	⌂	S	CrlvCC	Crimson Cloud		T	◆	▲	✱	●		
								Hawthorn, Green; *Crataegus viridis*									
	↔	4	○	W	□	⌂	S	CrvrWK	Winter King		T	◆	▲	✿	●	A	B
								Hawthorn, Washington; *Crataegus phaenopyrum*									
		4	○	W	□	⌂	S	Crph	unnamed cultivar		T	◆	▲	✿	●	A	
								Hazel—see Filbert									
								Honeylocust; *Gleditsia triacanthos*									
	↔	4	○	W	□	⌂		GltrIm	Imperial			◆	▲			A	
		4	○	W	□	⌂		GltrMo	Moraine			◆	▲			A	
		4	○	W	□	⌂		GltrSh	Shademaster			◆	▲			A	
		4	○	W	□	⌂		GltrSk	Skyline			◆	▲			A	

1 Height	2 Width	3 Hardiness	4 Sun/shade	5 Soil acidity	6 Soil drainage	7 Urban stress	8 Transplanting	Common name; *Scientific name* Page code	Cultivar name	9 Nuisances	10 Hazards	11 Diseases	12 Insects	13 Flowers	14 Fruit	15 Foliage	16 Features
								Hophornbeam, American; *Ostrya virginiana*									
		4		N			R	Osvi	no cultivars			◇	△				B
								Hornbeam, American; *Carpinus caroliniana*									
	↔	3		N			S	Caca	no cultivars							A	B
								Hornbeam, European; *Carpinus betulus*									
	↑	5		W			S	CabeFa	Fastigiate								B
								Horsechestnut; *Aesculus hippocastanum*									
		4		N				AehpBm	Baumann					✿			
								Horsechestnut, Red; *Aesculus x carnea*									
		5		N			R	AexcBr	Ruby Red	D				*			
								Katsura Tree; *Cercidiphyllum japonicum*									
		4		N			R	Cdja	cultivars rare			◇	△			A	W
								Lilac, Japanese Tree; *Syringa reticulata*									
		3		N				SyrtIS	Ivory Silk					✿			B
		4		N				SyrtRe	Regent					✿			B
	↔	3		N				SyrtSS	Summer Snow					✿			B
								Linden, American; *Tilia americana*									
		4		W				TiamLg	Legend					*			
		3		W				TiamRd	Redmond					*			
								Linden, Littleleaf; *Tilia cordata*									
	↑	3		W				TicoCh	Chancellor					*			
	↑	3		W				TicoCo	Corinthian					*			
		3		W				TicoFa	Fairview					*			
		3		W				TicoGl	Glenleven					*			
		3		W				TicoGr	Greenspire					*			
								Linden, Silver; *Tilia tomentosa*									
		4		W			S	TitoGM	Green Mountain					✿			L
		4		W			S	TitoSt	Sterling					✿			L
								Magnolia, Cucumbertree; *Magnolia acuminata*									
		4		W				Mgac	cultivars rare			◇		*	●		
								Magnolia, hybrid; *Magnolia* hybrids									
	↑	6		N			R	MgxxGa	Galaxy	D				*			
	↔	4		N			R	MgxlMe	Merrill					✿			
								Magnolia, Star; *Magnolia stellata*									
		4		N			R	Mgst	cultivars rare					✿			
								Maidenhair Tree—see Ginkgo									
								Maple, Amur; *Acer ginnala*									
	↔	3		W				Acgi	cultivars rare	F					●	A	
								Maple, Black; *Acer nigrum*									
	↑	5		W				AcniGr	Greencolumn			◇				A	
								Maple, Freeman Hybrid; *Acer x freemanii*									
	↑	4		N			S	AcxfAr	Armstrong	L							
		4		N			S	AcxfAB	Autumn Blaze	L						A	
		4		N			S	AcxfCl	Celebration	L				*		A	
	↑	4		N			S	AcxfSS	Scarlet Sentinel	L				*		A	
								Maple, Hedge; *Acer campestre*									
		5		W				AccmQE	Queen Elizabeth			◇	△			A	

1 Height	2 Width	3 Hardiness	4 Sun/shade	5 Soil acidity	6 Soil drainage	7 Urban stress	8 Transplanting	Common name; *Scientific name* / Page code	Cultivar name	9 Nuisances	10 Hazards	11 Diseases	12 Insects	13 Flowers	14 Fruit	15 Foliage	16 Features
								Maple, Norway; *Acer platanoides*									
■		4	●	W	□	⌂		AcplCl	Cleveland	L		◆	▲			A	
■	↑	4	●	W	□	⌂		AcplCo	Columnar			◆	▲			A	
■		4	●	W	■	⌂		AcplCK	Crimson King	L		◆	▲			G	
■		4	●	W	□	⌂		AcplDb	Deborah	L		◆	▲			G	
■		4	●	W	□	⌂		AcplEL	Emerald Lustre	L		◆	▲			A	
■		4	●	W	□	⌂		AcplEQ	Emerald Queen	L		◆	▲			A	
■		4	●	W	□	⌂		AcplOl	Olmsted	L		◆	▲			A	
■		4	●	W	□	⌂		AcplPa	Parkway	L		◆	▲			A	
■		3	●	W	□	⌂		AcplSc	Schwedler	L		◆	▲			G	
■		4	●	W	□	⌂		AcplSm	Summershade	L		◆	▲			A	
■		4	●	W	□	⌂		AcplSu	Superform	L		◆	▲			A	
								Maple, Paperbark; *Acer griseum*									
■		5	●	N	■	⌂	S	Acgr	cultivars rare			◆	▲			A	B
								Maple, Red; *Acer rubrum*									
■	↔	4	●	A	□	⌂	S	AcruAF	Autumn Flame	L		◆	▲			A	B
■	↑	4	●	A	□	⌂	S	AcruBo	Bowhall	L		◆	▲	✱		A	B
■	↑	4	●	A	□	⌂	S	AcruKa	Karpick	L		◆	▲			A	B
■		3	●	A	□	⌂	S	AcruNo	Northwood	L		◆	▲	✱		A	B
■		5	●	A	□	⌂	S	AcruOG	October Glory	L		◆	▲	✱		A	B
■		4	●	A	□	⌂	S	AcruRS	Red Sunset	L		◆	▲	✱	●	A	B
								Maple, Shantung Hybrid; *Acer truncatum hybrids*									
■		4	●	W	□	⌂		AcxxNS	Norwegian Sunset			◆	▲			A	
■		4	●	W	□	⌂		AcxxPS	Pacific Sunset			◆	▲			A	
								Maple, Silver; *Acer saccharinum*									
■		3	●	N	□	⌂		Acsa	several cultivars	B	P	◆	▲				
								Maple, Sugar; *Acer saccharum*									
■		4	●	N	■	⌂		AcscBn	Bonfire			◆	△			A	
■		5	●	N	■	⌂		AcscCm	Commemoration			◆	△			A	
■	↑	4	●	N	■	⌂		AcscGo	Goldspire			◆	△			A	
■		4	●	N	■	⌂		AcscGM	Green Mountain			◆	△			A	
■		4	●	N	■	⌂		AcscLg	Legacy			◆	△			A	
■		4	●	N	■	⌂		AcscSC	Seneca Chief			◆	△			A	
								Maple, Tatarian; *Acer tataricum*									
■	↔	3	●	W	□	⌂		Acta	cultivars rare			◇	△		●	A	
								Maple, Trident; *Acer buergeranum*									
■	↔	5	●	N	□	⌂		Acbu	cultivars rare			◇	△			A	
								Mountain Ash; *Sorbus* species									
■		2	○	N	■	⌂		Sr	many cultivars			◆	▲	✿	●	A	
								Oak, Bur; *Quercus macrocarpa*									
■	↔	4	●	W	□	⌂	S	Quma	no cultivars	F		◆	▲				B
								Oak, English; *Quercus robur*									
■	↑	4	●	N	□	⌂	S	QuroAt	Attention!	F		◆	▲				
■	↑	5	●	N	□	⌂	S	QuroFa	Fastigiate	F		◆	▲				
■	↑	4	●	N	□	⌂	S	QuroSm	Skymaster	F		◆	▲				
■	↑	5	●	N	□	⌂	S	QuroSr	Skyrocket	F		◆	▲				
								Oak, Northern Red; *Quercus rubra*									
■		5	●	N	■	⌂	S	Quru	cultivars rare	F	S	◆	▲			A	
								Oak, Pin; *Quercus palustris*									
■		5	○	A	□	⌂	S	Qupa	cultivars rare	F		◆	▲			A	

Height	Width	Hardiness	Sun/shade	Soil acidity	Soil drainage	Urban stress	Transplanting	Common name; *Scientific name* Page code	Cultivar name	Nuisances	Hazards	Diseases	Insects	Flowers	Fruit	Foliage	Features
1	2	3	4	5	6	7	8			9	10	11	12	13	14	15	16
								Oak, Sawtooth; *Quercus acutissima*									
■	↔	5	●	N	□	⌂	S	Quac	no cultivars	F		◆	▲				
								Oak, Shingle; *Quercus imbricaria*									
■	↔	5	●	W	□	⌂	S	Quim	no cultivars	F		◆	▲				
								Oak, Shumard; *Quercus shumardii*									
■		5	●	W	□	⌂	S	Qush	no cultivars	F		◆	▲			A	
								Oak, Swamp White; *Quercus bicolor*									
■		4	●	A	□	⌂	S	Qubi	no cultivars	F		◆	▲				B
								Oak, Willow; *Quercus phellos*									
■		6	●	A	□	⌂	S	Quph	no cultivars	F		◆	▲				
								Pagodatree; *Sophora japonica*									
■		6	○	N	□	⌂		SojaPU	Princeton Upright	D		◆	▲	✿			
■		5	○	N	□	⌂		SojaRe	Regent	D		◆	▲	✿			
								Pear, Ornamental Birchleaf; *Pyrus betulifolia*									
■		4	●	N	□	⌂	S	PybeDn	Dancer			◆	△	✿		L	
								Pear, Callery; *Pyrus calleryana*									
■		5	●	W	□	⌂	S	PycaAr	Aristocrat	M		◆	△	✿		A	
■		5	●	W	□	⌂	S	PycaAB	Autumn Blaze	M		◆	△	✿		A	
■		5	●	W	□	⌂	S	PycaBr	Bradford	M	B	◆	△	✿		A	
■	↑	5	●	W	□	⌂	S	PycaCa	Capital	M		◆	△	✿		A	
■	↑	5	●	W	□	⌂	S	PycaCh	Chanticleer, same as Cleveland Select	M		◆	△	✿		A	
■		5	●	W	□	⌂	S	PycaRd	Redspire	M		◆	△	✿		A	
■	↑	5	●	W	□	⌂	S	PycaWh	Whitehouse	M		◆	△	✿		A	
								Planetree, London; *Platanus x acerifolia*									
■		5	●	W	□	⌂	S	PlxaBl	Bloodgood	D	S	◆	▲				B
								Redbud, Eastern; *Cercis canadensis*									
■	↔	4	●	W	■	⌂		Ccca	several cultivars			◆	▲	✳		A	
								Redwood, Dawn; *Metasequoia glyptostroboides*									
■	↑	5	●	N	■	⌂		Mtgl	cultivars rare			◇	△			A	B
								Rubber Tree—see Hardy Rubber Tree									
								Scholartree—see Pagodatree									
								Serviceberry; *Amelanchier* species and hybrids									
■		4	●	N	■	⌂	R	AmxgAB	Autumn Brilliance			◆	▲	✿	●	A	B
■		4	●	N	■	⌂	R	AmlvCu	Cumulus			◆	▲	✿	●	A	B
■		4	●	N	■	⌂	R	AmlvMa	Majestic			◆	▲	✿	●	A	B
■		4	●	N	■	⌂	R	AmxgPD	Princess Diana			◆	▲	✿	●	A	B
■		4	●	N	■	⌂	R	AmxgRH	Robin Hill			◆	▲	✿	●	A	B
■		4	●	N	■	⌂	R	AmxgTr	Tradition			◆	▲	✿	●	A	B
								Sweetgum; *Liquidambar styraciflua*									
■		5	○	A	□	⌂	S	ListGD	Gold Dust	F	S	◆	▲			G	B
■		5	○	A	□	⌂	S	ListMO	Moraine	F	S	◆	▲			A	B
								Sycamore—see Planetree									
								Tuliptree; *Liriodendron tulipifera*									
■		5	●	N	■	⌂	S	Lrtu	cultivars rare		B	◆	▲	✳		A	
								Yellowwood; *Cladrastis kentukea*									
■	↔	4	●	W	■	⌂		Clkn	cultivars rare		B	◇	△	✿		A	F
								Zelkova; *Zelkova serrata*									
■		5	●	N	□	⌂	S	ZeseGV	Green Vase		B	◇	△			A	B
■		6	●	N	□	⌂	S	ZeseHl	Halka		B	◇	△			A	B
■	↔	5	●	N	□	⌂	S	ZeseVG	Village Green		B	◇	△			A	B
1	2	3	4	5	6	7	8			9	10	11	12	13	14	15	16

STREET TREE FACTSHEETS

INTRODUCTION

Planting a tree is an act of faith, an attempt to make our community a better place to live. Trees, we believe, will improve our environment not just for us, but also for our children and grandchildren. We also must have confidence that someone will properly care for the trees. A succession of people must prune trees correctly, protect them from onslaughts of diseases and insects, and quench their thirst during droughts. Well kept trees are an expression of pride in our community.

Technical information is needed if trees are to be selected wisely and cared for properly. Accordingly, the factsheets provide data that will aid in the prudent selection of trees for various kinds of urban planting sites. Information also is provided on evaluating sites, selecting and obtaining trees, planting trees properly, and cultural requirements.

SCOPE OF THE FACTSHEETS

The trees that have been included are suitable for use as street trees, and available from nurseries. They are adapted mainly to the temperate zone of North America and to climatically similar regions elsewhere. Species and cultivars (a contraction of *culti*vated *var*ieties) were chosen using results of a survey of fifty-seven knowledgeable nurserymen, city foresters, and other experts. They prioritized trees according to the suitability of each for use as a street tree, and also indicated the relative availability from nurseries in their regions.

Most of the cultivars that are included were chosen for their superior qualities as street trees. They are propagated vegetatively, and therefore have predictable characteristics. Many other promising cultivars introduced into the trade in recent years were not included due to incomplete information about their performance.

Not every tree in this book is recommended for street tree use. For example, silver maple, 'Bradford' callery pear, and American elm are included because they are commonly found along streets. But each has severe disadvantages that should disqualify it from most street tree situations. The factsheets explain disadvantages, so that problems can be avoided.

The factsheets focus on street trees because they require the most careful selection in relation to stressful sites, space constraints, and tree care practices. However, the information also is useful in selecting trees for less problematic situations, such as parks or spacious residential properties.

SOURCES OF INFORMATION AND PHOTOGRAPHS

Several sources of information were used in compiling the factsheets. Substantial data were provided from the ***Handbook of Landscape Tree Cultivars*** (Wandell 1989). Data on cold hardiness and availability also were provided by Willet N. Wandell. A thorough search of technical articles and books, plant patents, and nursery catalogs yielded much additional information.

Drafts of the original 122 factsheets (Gerhold *et al.* 1989) were revised after a critical review by experts assembled at Longwood Gardens, Pennsylvania. The reviewers' professional opinions, based on many years of experience, were screened for objectivity by their peers as each factsheet was discussed.

The factsheets added in this edition were reviewed individually by experts rather than in an assembled group. The valuable contributions of the following are acknowledged with gratitude:

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USER'S GUIDE

The Index of Tree Names and Characteristics provides an overview of all of the factsheets. Species and cultivars are arranged alphabetically by common names, and referenced to factsheets by abbreviations of their scientific names. Characteristics of each tree are represented in a simplified symbolic form, so that comparisons among species and cultivars can be made quickly. The index can be used to sort out trees that are suited to a particular site, by focusing on those characteristics that are most important at that site. Then the factsheets of these trees can be studied for additional details that may influence a final choice.

How valid are the factsheets? The thoroughness and expertise that went into their preparation offer assurance that they contain the most reliable and complete information that is available. But there are some uncertainties in the data that have two principal causes.

First, the performance of cultivars can vary greatly under different environmental conditions. Growth rate, mature size, and longevity are depressed by urban stresses caused by barriers to root development, compacted soil, drought, heat, pollutants, and other environmental insults. Diseases and insects are greatly affected by climatic conditions, and thus the damage they cause varies among regions and years. Studies that have compared the performance of cultivars under a range of urban conditions have been very limited. So most of our knowledge is based on scattered observations made under variable conditions.

Second, mature characteristics of a cultivar can be known with certainty only after several decades of observations. Therefore newer cultivars are less reliable than those that have been in use for many years. For example, Moraine honeylocust, Snowdrift crabapple, and Bradford callery pear are still being planted widely after thirty or more years in the trade. But Bradford is declining now presumably due to frequent storm breakage of mature trees. Improved cultivars are continually being introduced in these and other species, and they certainly deserve to be tried, though initially only in limited numbers. One indication of the reliability of information is the year of introduction given in the factsheets.

The factsheets have a standardized format designed so you can readily find information needed in choosing species and cultivars for specific planting sites. Factsheets describing species are included for those species in which no cultivars are commonly available, or to provide an overview for a group of cultivars, or to compare cultivars with unimproved trees grown from seed. The standardized format includes the following:

Common and Scientific Names. Valid taxonomic names are given in most cases, but some alternative names that commonly appear in nursery catalogs also are included. The trade name may differ from the cultivar name (in single quotes), because of the legalities of ownership rights conferred by Plant Patents and Trademarks.

Pagination. Abbreviations of scientific names are used in place of page numbers so that factsheets can be alphabetized by tree name for easy referencing, and so that trees of the same genus are grouped together. The abbreviations are also handy in taking field notes or inventory data.

Height and Width. Estimates of the range in mature height and crown width apply to better-than-average suburban sites, e.g. a broad tree lawn in a residential neighborhood. Estimates are also given for age 30, which is a common practice in nursery catalogs (though not always explained). For more stressful urban sites, estimates can be reduced by perhaps 10 to 40 percent, as stature is greatly influenced by site quality. Estimates are based on figures in reference books and nursery catalogs, which contain significant inconsistencies. Despite such variability, sizes are useful for design purposes and for comparisons among species and cultivars.

Color Codes and Symbols. Because tree size is so important in selection, factsheets are color coded along the edges for rapid reference. Short trees, under 30 feet, are coded green; medium trees, 30 to 45 feet, are yellow; and tall trees, over 45 feet, are red. Narrow trees are coded blue, indicating their width is no more than half their height.

Three symbols denoting compatibility of tree heights with overhead utility wires have corresponding colors. They also refer to the planting zone concept explained in the section, Advice On Utilities And Trees. Electric utility lines typically are at heights of 25' to 45'. The symbols are a reminder at the time of selection to avoid conflicts of trees with wires.

Hardiness Zones. USDA Hardiness Zones (see map), based on average annual minimum temperatures, are used to indicate geographic limits of cold hardiness. The zones also have been used as a reference to limits of adaptation to warm climates, indicated by the higher numbers. These are less reliable than limits to cold hardiness, as less information is available. Furthermore, the map does not take into account maximum temperatures or precipitation in the summer, which would be more useful for indicating heat and drought tolerance.

Crown. The three-dimensional shapes (and corresponding outlines) used to describe crowns are globose (circular), ovate (egg-shaped or oval), columnar (rectangular with rounded corners), conical (triangular with pointed or rounded top and corners), and vase-shaped (branches ascending in a "V" and curving to a rounded canopy). Textures ranging from fine to coarse describe the overall appearance of foliage and branches. Shapes and textures are useful in designing landscapes.

Foliage. Typical leaf sizes and colors in summer and fall are described, along with any unusual features such as compound leaves or glossy surfaces.

The notation "same as the species" under any of the headings serves as a reminder that the information which follows is typical of most trees of the species. In other words, the cultivar does not differ in this respect.

Flowers and Fruit. Any significant ornamental features or nuisances are described. "Inconspicuous" indicates that this trait can be ignored for practical purposes, though it could be of scientific interest.

Description. Geographic and environmental aspects of the natural habitat, the origin of a cultivar, growth rate, and other noteworthy features are described. These help to explain its uses and site requirements. The date of commercial introduction indicates how long a cultivar has been under observation. Older dates suggest that the information may be more reliable.

Advantages. The principal characteristics which favor the selection of this tree for particular uses are stated, especially in relation to stressful urban sites. Appropriate sites for more sensitive species are mentioned.

Limitations. The most important undesirable features are stated, especially those which should limit use of this tree along streets or in other municipal settings.

Site and Culture. Site conditions appropriate for the tree are described, as well as special needs for planting and proper care.

Cultivars. This heading appears only on species factsheets. Information is given about landscape uses of cultivars for which no factsheets are included. The relative desirability of cultivars versus trees grown from seed is addressed where appropriate.

Notes. The remaining space may be used to add notes from personal observations or new literature.

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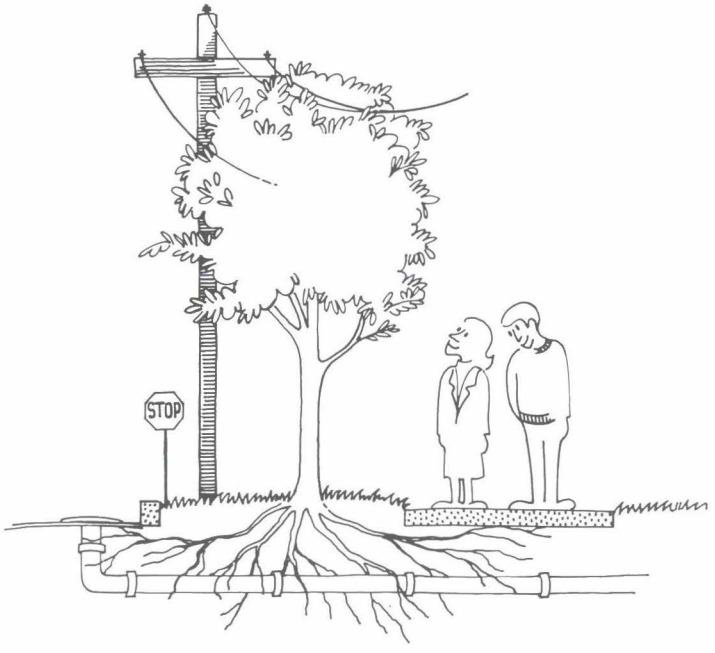
ADVICE ON ANALYZING PLANTING SITES

If trees are to thrive in your community and provide the benefits expected of them, they must be well suited to site conditions. A thoughtful analysis of each planting site is essential before selecting species and cultivars that have the needed adaptive and appearance traits.

This analysis simply requires you to identify anything important that may affect the trees to be planted or that may be affected by them. To do this, you need only a basic understanding of trees and common sense. As you gain experience with trees in urban settings, you will soon become more confident of your abilities to select appropriate species and cultivars.

In examining a site, always LOOK UP, LOOK DOWN, LOOK ALL AROUND! Consider how trees will react to site conditions, especially adverse effects. And then picture how the trees in that setting would look at maturity.

SITE ANALYSIS



People in the Neighborhood

The attitudes and activities of people are an important part of the site analysis. People in the neighborhood may be enlisted to water and protect trees, or they might trample them, scrape them, or even break them. Injuries and broken branches from lawn mowers, weed wackers, car doors, truck scrapes, and vandalism are some of the most serious health threats. Assistance from local residents, together with protective devices, might overcome some of these problems.

You can learn about people's attitudes during site visits to the neighborhood, or through specially arranged town meetings. Efforts to involve local residents and others interested in community trees may be just as crucial for success as attention to the trees and their physical environment.

Design of the Landscape

People's desires also should be considered in designing landscape plantings, along with functional purposes of the trees. Trees should complement architectural features, such as residences, places of business, parking lots, or special views of historic buildings, monuments, rivers, or mountains. The site analysis should determine whether trees are to emphasize, hide, or merely fit in with such features; also whether a group of trees should be formal and uniform, or informal with diverse species, shapes, colors, or textures.

Safety Considerations

There are several concerns about safety in transportation corridors when street trees are to be planted. Clearance is needed for pedestrians, vehicles, and utility lines. A separate section on utilities and trees explains how safety can be assured. Trees also should not impair visibility at intersections and traffic signs, or interfere with lighting at night. All of these will influence choice of trees, as well as initial size, placement, and pruning. Cultivars offer an advantage because their growth form and dimensions are more predictable than trees grown from seed.

Space Constraints

Space for trees is limited on many urban sites. Where trees are to be planted between a sidewalk and street curb, these physical barriers constrain the normal growth of the root system. The width of the tree lawn limits the size of the tree that can be supported by the soil and water in this space. It also limits the permissible growth of branches before they must be pruned for clearance of pedestrians (8-foot height) and vehicles (13-foot height). Trees with ascending branches are preferable. The following guide may be useful:

Width of tree lawn	*Size of mature tree*	*Color code*
2 to 4 feet	small	green
4 to 6 feet	medium	yellow
more than 6 feet	large	red

Tree pits excavated within sidewalks are much more confining than tree lawns. Not only the size of the hole (at least 4 by 4 feet for small trees), but also pipes, wires, or basements that may extend into this space must be considered. Containers that are above-ground constrain roots most severely, and also expose the root system to extremes of temperature and drought. Although some species can tolerate such conditions better than others, even their growth and health will be adversely affected.

Above-ground space constraints are more obvious than those underground, but are often overlooked. Tree height, crown width, and branching habit must be compatible with adjacent trees, buildings, street lights, and signs. The presence of electric, water, sewer, and gas utilities, below or above ground, must always be noted. These are explained in the section on utilities.

Climate and Soil

The USDA Plant Hardiness Zone Map indicates the coldest average temperatures that have been observed in a locality and provides a reference to the climatic adaptability of trees. The microclimate surrounding a tree may be modified by structures that increase or decrease temperature, moisture, or exposure to sunlight. Thus buildings may exert an adverse or favorable influence and may affect the choice of species.

Soil information can be rather complicated, so you should focus on those soil properties that are most likely to affect tree health. Few difficulties are encountered in spacious residential areas, where soils usually are suitable for most kinds of trees. At downtown sites additional considerations are soil compaction, alkalinity from concrete, low organic matter, and extraneous rubble which adversely affect some species more than others.

Health Threats to Trees

Biotic diseases and insects usually are associated more closely with host species than with characteristics of planting sites. Resistant species and cultivars should be selected for more stressful sites. Avoid planting the more susceptible species or cultivars.

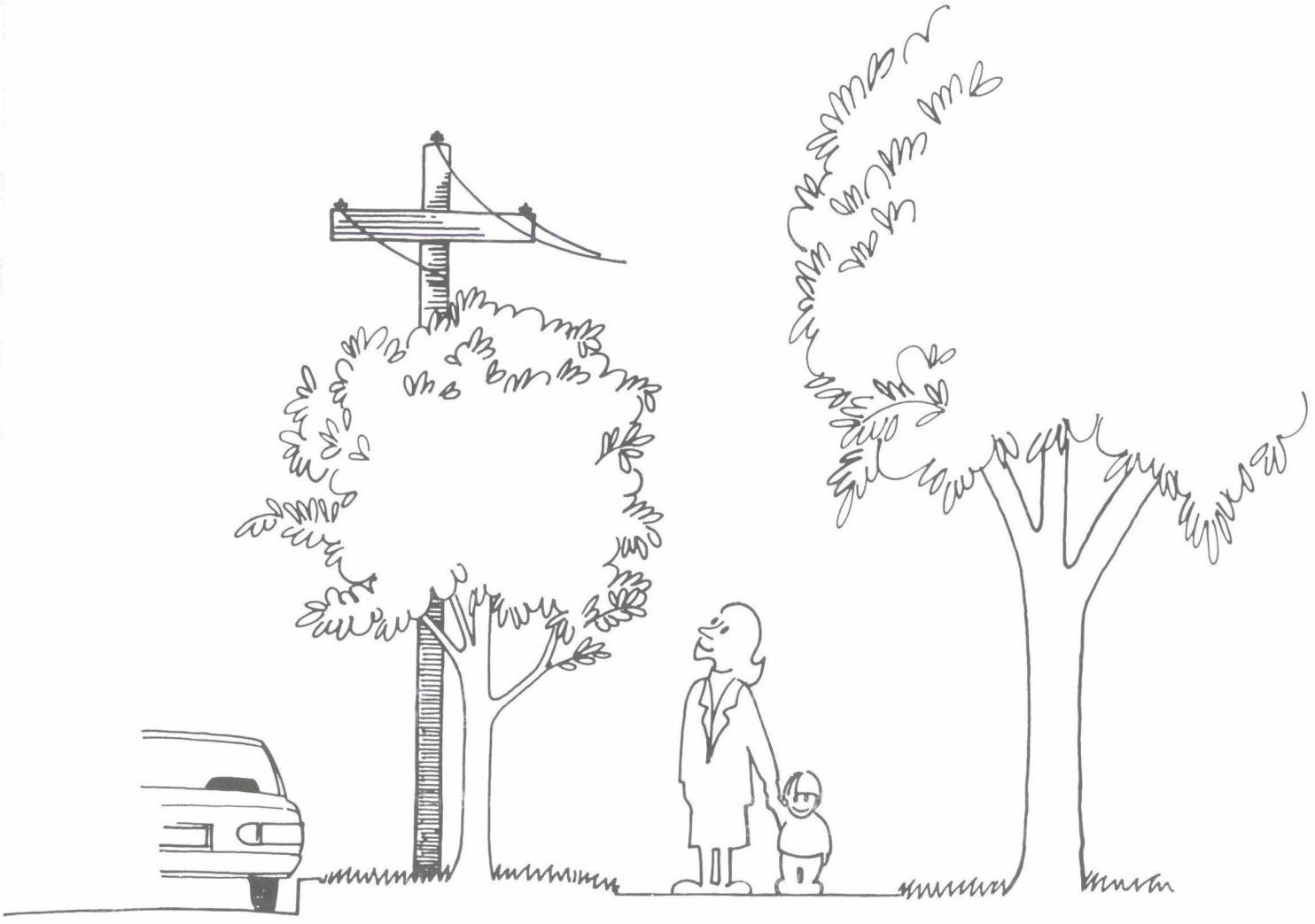
Managerial Environment

Some adverse site effects can be ameliorated by cultural practices. If these cannot be provided by a systemic tree care program, choices should be limited to the toughest trees that require little or no maintenance.

ADVICE ON UTILITIES AND TREES

Serious conflicts have developed between utilities and street trees. More than one billion dollars spent annually by U.S. utilities on tree pruning are passed on as costs to consumers. Too often, trees have been disfigured by improper pruning and injured by excavation for underground wires and pipes. Mistreatment of trees has made people irate.

Many of these problems can be reduced through better understanding and planning. Improved arboricultural methods such as natural pruning instead of topping trees, or underground tunneling instead of trenching, can minimize adverse effects on the health and appearance of trees. But the preferred, long range solution is to avoid conflicts by selecting compatible trees and positioning them so they will not grow into utilities. The following information will help you to understand the situation and to "plant the right tree in the right place".



PLANT THE RIGHT TREE IN THE RIGHT PLACE

Electric Distribution Lines

Electric service distributed through overhead wires is subject to interruption when branches touch the wires, or when storms cause trees to blow or fall into the wires. Utility companies are required to prune trees to prescribed distances, which vary with different line voltages and types of construction (American National Standards Institute 1988). The purpose of pruning is to ensure public safety and to minimize interruptions or outages caused by trees, especially during storm emergencies. A major concern is the safety of children or others who may climb trees and be shocked or even electrocuted. Overhead electric wires are not insulated!

Electric wires can be recognized by the insulators which fasten them to the poles or crossarms, typically at heights of 25 to 40 feet. Other wires lower on the same poles may include insulated telephone or cable TV lines, which must be protected only from branches that rub against them.

Some people complain strenuously when trees are disfigured by pruning, or when they hear of a proposal to remove large trees, especially several at a time. Topping of trees, sometimes called stubbing or rounding, not only destroys their natural form but also may adversely affect their health. Some of these concerns can be minimized by training workers to place pruning cuts so that they preserve the natural branching pattern. But where large trees are too close to wires, large portions of their limbs must be pruned off. When trees deteriorate with age or urban stress and become hazards, they must be removed.

Why not bury wires? That is feasible only in new developments, where it has become commonplace. The expense usually would be prohibitive in older residential neighborhoods, and excavation would damage roots of the very trees that one wants to preserve. A better alternative is to gradually remove hazardous and disfigured trees, and to replace them with smaller trees that will not conflict with wires.

Underground electric installations require maintenance, too. Excavation for repairs can damage tree roots. Therefore trees should be planted far enough away to permit access by equipment and to keep most roots clear of any trenches that may be dug in the future. Transformer boxes indicate where underground lines may be located.

Gas, Water, and Sewer Pipes

Planted trees also should be kept clear of gas, water, and sewer pipes. Excavations could become necessary for repairs, which would damage any tree roots in the way. When selecting planting locations, one should be alert to surface indications of pipes nearby, such as manhole covers or covers on valve access pipes.

Intrusion of roots into pipes is a potential problem only when segmented pipes are present, for example, clay sewer pipes. Then certain tree species which invade pipes should be excluded from consideration.

One-Call System

Whenever street trees are to be planted using excavating equipment, there is a risk of damage, injury, or even death if underground utilities were to be ruptured. To prevent this, a One-Call Communication System has been established.

Excavators are required to notify the One-Call Center before work begins. A utility representative then will mark locations of any nearby underground facilities.

Most municipalities are members of the One-Call System. The municipal public works office should be able to provide information. Otherwise, contact your state public utility commission or the American Public Works Association (1313 East 60th Street, Chicago IL 60637-2881, phone 312-667-2200).

Compatible Tree Concept and Symbols

Utility foresters have developed a concept and symbols to guide the selection and positioning of trees that are compatible with power lines. Color-coded planting zones in the proximity of electric distribution lines indicate mature sizes of trees that are compatible when planted under wires or offset from them. Vertical and horizontal distances from wires are not specified, because the height of wires may vary from 25 feet to 40 feet or more. Trees should be planted far enough away from wires so that they cannot grow or fall into them. Mature heights of trees are indicated by the colored symbols and the colored stripes on the factsheet edges corresponding to colors of the planting zones:

Green indicates the tree is appropriate for power lines. Its mature height is less than 30 feet, so the tree is appropriate for planting under or near power lines or other places where space is limited, such as tree lawns 2 to 4 feet wide. Little pruning will be required to assure public safety and reliable utility service. This tree also has other desirable attributes, such as durability, beauty, and low maintenance.

Yellow indicates the tree is questionable near power lines. Mature height is 30 to 45 feet. May not be compatible with power lines, unless wires are high enough or the tree is far enough away. Suitable for tree lawns 4 to 6 feet wide if there is ample space for the crown. Contact your local utility before choosing to plant this tree near power lines.

Red indicates the tree should not be planted near power lines. Mature height is over 45 feet. Spacing of 35 to 50 feet from power lines, buildings, or other trees is suggested. Suitable for tree lawns more than 6 feet wide or other places where ample space exists for growth of the crown and roots. Selecting a more appropriate tree for planting near power lines will assure greater public safety, reduce power outages and reduce expenditures for pruning and line repair.

Blue indicates a narrow crown. Crown width at maturity is no more than half of the tree height, which may be short, medium, or tall. A narrow tree is suitable where space to the sides of the crown is limited, or where the narrow shape is used for accent in the landscape design.

PLANTING ZONES

ADVICE ON SELECTING SPECIES AND CULTIVARS

Proper selection of species and cultivars to be used as street trees is one of the most important tasks in a municipal tree program. Poor choices can lead to all kinds of problems, such as low survival rate after planting, sickly and unattractive trees, litter from fruit or other plant parts, lifting of sidewalks, interference with wires or pipes, or even premature death. In contrast, good choices provide the many benefits that trees have to offer year after year. Maintenance costs can be reduced greatly, costs which consume the major part of a municipal tree budget. So the time spent on careful selection is a wise investment.

SELECTING SPECIES AND CULTIVARS

Who Selects Municipal Trees?

Because selection is so important, the person or group that decides on species must use sound judgment and technical information applicable to the local situation. Responsibility for selecting trees in a municipality may be assigned to a tree commission, a city forester, or some other official. If they lack experience with trees in urban locales, they should seek advice from someone who has the necessary expertise, such as a consultant or an urban forester with a state agency or university.

The Selection Process

The planting site analysis described previously provides a sound basis for selecting species and cultivars. The site may accommodate one tree, several, or many. The analysis leads to general specifications for trees that would be suitable on a particular site. Then species and cultivars must be found whose characteristics match the requirements.

The abundance of different species in the community also should be considered. An inventory of trees can supply this and other useful information. It is desirable to diversify species and cultivars as much as possible by planting those types that are not already too abundant. Damage from diseases and insects can be reduced by diversifying. Also, a richer assortment of plants adds interest and beauty, and provides better food and shelter for wildlife. Tree diversity in a community can be achieved even if some streets contain only one cultivar. Single cultivars along streets may be desirable for purposes of landscape design and managerial efficiency.

Because a very large number of species might be considered, it is convenient to sort these out by starting with the most limiting traits. Cold hardiness and mature size usually are among the first, regardless of site conditions. At downtown sites tolerance of urban stresses caused by space limitations on root growth, soil compaction, pollutants, heat, and drought are important. In spacious residential neighborhoods, the main considerations may be the form, texture, and seasonal color of trees that complement the buildings and vegetation around them.

Thoroughness in matching species to sites is more important than the sequence in which traits are considered. As the list of potential species is reduced through initial sorting, attention tends to shift to other traits that are less dependent on site conditions, but important nevertheless. These include pest resistance and maintenance needs. At this stage one thinks about cultivars, if they are available in the species being considered.

Cultivars

Cultivar is a contraction of *cultivated variety*. When applied to landscape trees, cultivar denotes a tree was selected for superior qualities, propagated vegetatively, and named. The name may be protected by adopting and registering a Trademark. The cultivar itself may be protected by a Plant Patent. Such protection provides incentives to develop and market improved plants. The trade name, for example Harvest Gold crabapple or Shademaster honeylocust, may differ in some cases from the cultivar name, 'Hargozam' or 'PNI 2835'. Due to recent changes in patenting requirements, the naming protocols have caused some confusion in the trade. The trade name which appears at the top of each factsheet is most commonly used in purchasing trees.

A cultivar may be propagated vegetatively by budding onto ordinary seedlings or special rootstocks. Thus the above-ground portions of all trees belonging to this cultivar are genetically identical. Each cultivar is uniform in appearance and its characteristics are predictable. Some cultivars can be propagated by rooting cuttings or by tissue culture, so that all parts of the tree are genetically identical. Growing a tree "on its own roots" is advantageous in cases where it eliminates problems due to graft incompatibility or suckers growing from rootstocks.

Index of Tree Names and Characteristics

Some of the most important characteristics of species and cultivars are tabulated in the Index of Tree Names and Characteristics. This table can facilitate selection by enabling the user to quickly compare species and cultivars. Columns in which the most limiting traits for particular sites are represented can be used to sort out prospective trees that meet the site requirements.

Further details about these prospective trees can then be found in their factsheets, referenced in the table by the botanical name abbreviations used instead of page numbers. Specific details in the factsheets will aid in the final selection of trees.

Making the Final Choices

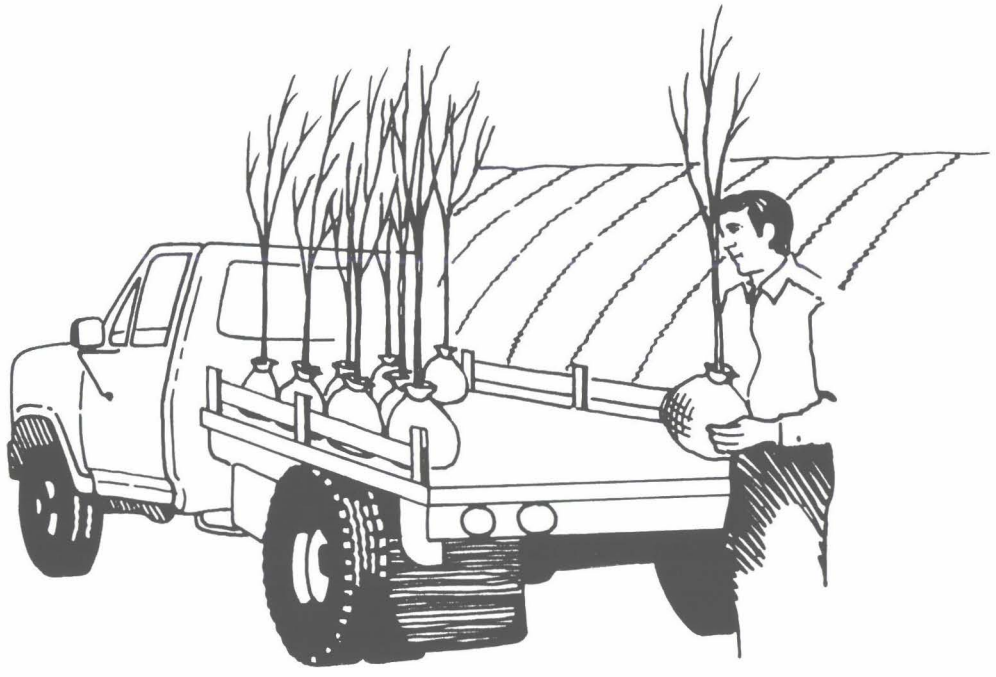
You may want to make alternative choices for those species or cultivars that may be difficult to find in nurseries. Listing such alternates when bids are requested will facilitate the procurement process.

Selecting the ideal tree for a site involves, science, art, and a measure of good luck. It requires predicting how a site may change and how well a tree will perform. Even though our knowledge is imperfect, by using good judgment you should be able to avoid making serious mistakes. And the task of selecting good trees will remain an enjoyable challenge!

ADVICE ON PROCURING TREES FROM NURSERIES

Procuring trees that have been grown, dug, and transported properly is just as important as selecting appropriate species or cultivars. The requirements for street trees are somewhat different than those for trees used in other landscape settings. They need to be large enough and free of limbs high enough for clearance of pedestrians and vehicles. A single straight trunk that does not fork below 6 to 8 feet is preferable if the tree will be planted within a few feet of a sidewalk or street.

The municipal buyer must insist on specifications that ensure the proper type of tree. Some nurserymen are not fully aware of these special requirements for municipal trees, as most of their trees may be grown for other customers who prefer lower branching and even multiple trunks in some species. Inspection of trees prior to purchase is recommended. Most nurseries welcome visitors and permit buyers to tag each tree that is to be purchased. Quality should receive much greater attention than price, but a higher price will not necessarily result in higher quality.



PROCURING TREES FROM NURSERIES

Specifications

The essential reference for specifications is the *American Standard for Nursery Stock,* sold by the American Association of Nurserymen, 1250 I St. NW, Suite 500, Washington, DC 20005. For various categories of plants, height-diameter relationships and root ball sizes have been established. These are based on caliper, which is the trunk diameter measured 6 inches above the ground on trees that are 4 inches in caliper or smaller.

Balled and burlapped trees have certain advantages over bare-root trees. B&B stock is grown with many fine roots and root hairs in a compact ball and packaged with nursery soil intact. Absorption of water and nutrients occurs mainly through fine roots, which also initiate new root growth. So B&B trees are most reliable for good survival and new growth; they also can be planted over a longer span of time. Trees shipped in various containers can be nearly as desirable, if they have not developed circling roots from growing in the container too long. Bare-root trees are less expensive, and can give good results if extra care is exercised during shipping, storage, and planting.

The most common sizes of street tree planting stock are 1½ to 2½ inches in caliper. Smaller, less expensive trees may be suitable for planting sites where growing conditions are ideal. The cost of trees above 2 inches in caliper increases much more with size, and such trees are too heavy to handle easily. But large trees are needed if a prominent landscape effect is desired immediately, or if severe urban stresses or vandalism are anticipated.

Several other specifications may be employed besides caliper, height, and size of root ball. *Tree Form* should be specified for species that might be grown with multiple trunks or low branching, as noted in the factsheets. For emphasis one can add, for example, "a single straight trunk to 7 feet with lower 5 feet clear of branches". The desired delivery date can be stipulated, but it must be recognized that weather conditions and trucking arrangements may cause a last minute change. You may ask the supplier to telephone prior to delivery so you can coordinate arrangements for workers and equipment. Guaranteed replacement of trees that fail to survive for one year is usually available from local nurseries at an added cost; this may require planting by nursery employees.

Be sure to guard against trees which may not be cold hardy in any species that has a native range extending far south of the planting site. When ordering such trees grown from seed, i.e. not a cultivar, specify that trees must be grown in a local nursery or in a colder hardiness zone.

Scheduling Orders and Deliveries

Some species are not recommended for planting in the fall because excessive injury or mortality may occur under certain weather conditions. Such species are noted in the factsheets, and designated "S" for spring planting in the Index of Tree Names and Characteristics.

It would be prudent to place orders for trees about four to six months before the planting date. Some species and sizes are rare, whereas others can be obtained shortly before they are needed.

Arrangements for workers, equipment, and supplies should be in place well before the planting date. Other preparations include contacting owners of property where trees are to be planted, and notifying the news media.

Receiving and Storing Trees

Upon arrival every tree should be inspected carefully, even if trees were examined previously in the nursery. Look for any severe bark scrapes on trunks or branches, cracked or loosened root balls indicating rough handling that tears small roots, or dried out roots, twigs, or buds. If too many trees are severely injured, this damage should be documented and witnessed; or else delivery should not be accepted. Reputable nurseries usually will replace trees that have been damaged or do not meet specifications.

Trees often are stored temporarily, but should be planted promptly after delivery. During storage they should be kept cool, shaded, and protected from adverse weather. The roots of bare-root trees must be covered with moist soil or other material such as peat moss or sawdust. Roots or root balls should be watered thoroughly every one to three days, and water permitted to drain away. Roots will suffocate if immersed too long in water.

When B&B trees are handled during loading and unloading, they should be grasped by the root ball, not the trunk. Don't drop them, but lower them gently to the ground, so that root hairs will not be broken. Protective devices around the trunk are left in place until trees have been planted, but some of these should be opened when trees are inspected upon arrival.

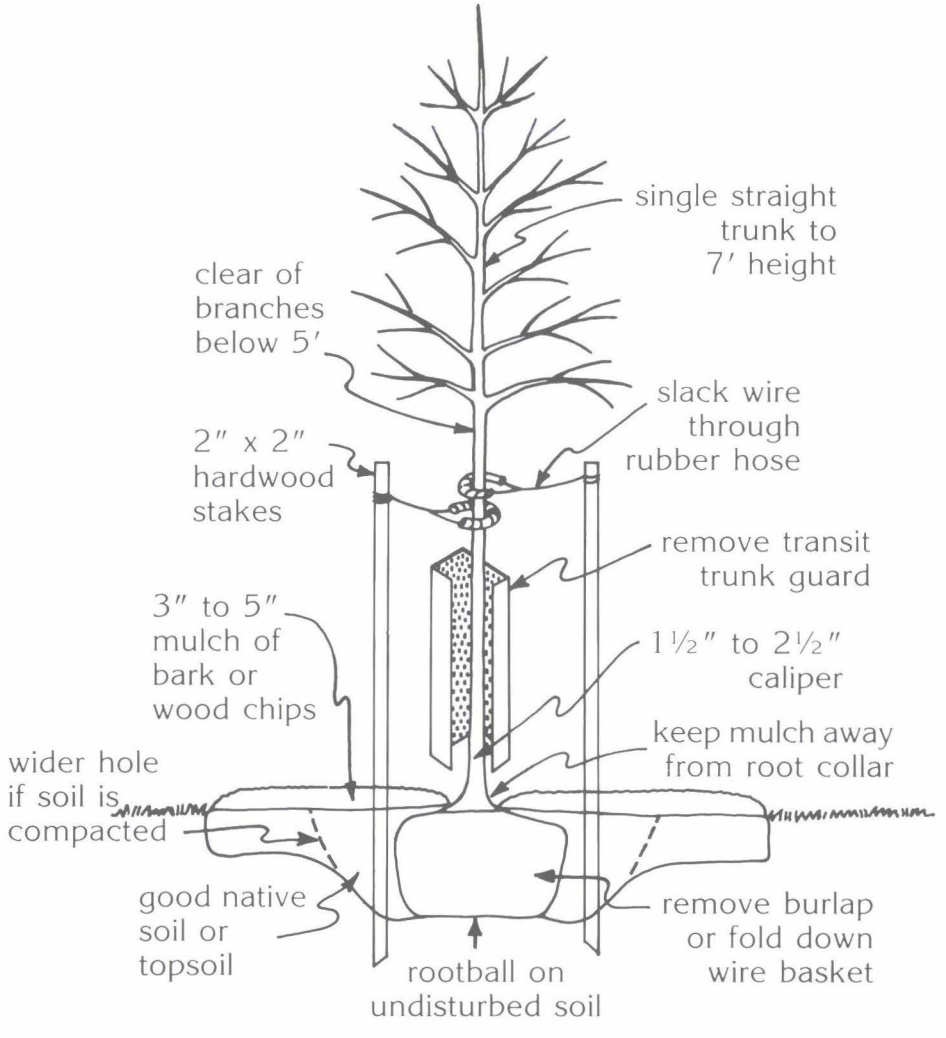
ADVICE ON PLANTING TREES

The ideal time for planting in temperate regions is in the spring, as soon as the ground has thawed and excess moisture has drained from the soil. For species that can be planted in the fall, the best time is soon after deciduous trees have dropped their leaves. Because weather is so changeable, the time for planting may arrive suddenly. So advance preparations are necessary. Remember One-Call!

Planting in Tree Lawns

The planting hole for a street tree usually is dug by a backhoe or other machine and finished by shovel. The hole should be as deep as the root mass and at least twice as wide. If the surrounding soil is compacted, an area up to five times the diameter of the root mass may be excavated or rototilled to a one foot depth. The loosened soil promotes root growth and moisture and oxygen levels favorable for the health of the tree.

Normally trees are planted so that the root collar is at the same level as the surrounding terrain. The root collar flares out at the base of the trunk, just above the roots. On a wet, poorly drained site, the tree may be planted a few inches higher. In arid climates or soils having excessive drainage, the tree may be planted a few inches lower. The flared base of the trunk always should remain above the surface and the roots should be covered with soil.


single straight trunk to 7′ height
clear of branches below 5′
slack wire through rubber hose
2″ x 2″ hardwood stakes
remove transit trunk guard
3″ to 5″ mulch of bark or wood chips
1½″ to 2½″ caliper
keep mulch away from root collar
wider hole if soil is compacted
good native soil or topsoil
remove burlap or fold down wire basket
rootball on undisturbed soil

TREE PLANTING DETAILS

The root ball of a B&B or containerized tree should rest on the bottom of the planting hole. Measure the proper depth before placing the tree in the hole. If any soil must be replaced to adjust the depth, tamp it firmly so that the tree will not settle later. For a bare-root tree, a cone-shaped pedestal of soil is mounded in the hole and tamped lightly, to support roots that are spread out in all directions. Remove burlap, cords, or other packaging material around the root ball to the extent possible. Cut and remove the upper part of a wire basket, and bend down the remainder so it will not interfere with roots as they grow.

Backfill the pit with native soil, or with ordinary topsoil if unsuitable subsoil or rubble has been excavated. Soil additives such as peat moss, sand, or leaf mold are usually unnecessary and may be counter-productive. As the hole is filled with loose soil, hold the tree so that its trunk is vertical and the root collar remains at the proper level. Water the entire excavated area to settle the soil and to assure adequate moisture for the roots. Tamping is not necessary, and may damage fine roots if excessive force is used. Wrapping materials are removed from the trunk after they have served their purpose—protection during transport and planting.

Planting in Sidewalks

Trees planted in sidewalk holes must contend with very stressful conditions. They can be helped most by maximizing horizontal dimensions of the hole and backfilling with good topsoil. The opening in the sidewalk should be at least 4 by 4 feet, and if possible much larger. A long trench 4 feet wide, in which two or more trees are planted, would be much better than separate holes. The depth should be equal to that of the root mass, with an allowance for any surface treatments such as tree grates or bricks.

Other measures may be necessary so that trees can cope with stressful downtown environments. Perforated plastic pipe can be used to promote aeration and drainage, and to facilitate watering trees during dry periods. A raised lip around the hole may be needed to exclude deicing salts in snowbelt locations. With near optimal levels of water, oxygen, and nutrients in the soil environment of roots, trees in downtowns can stay amazingly healthy. The size a tree can attain depends mainly on the volume and quality of soil accessible to its roots.

After holes in sidewalks have been engineered properly, trees are planted much the same as in tree lawns. Topsoil is filled up to the root collar, allowing space for tree grates or porous paving material.

Tree Supports

Stakes and support ties are recommended only if a tree needs support to remain upright, or if protection is needed from vehicle doors or people. Stakes about 6 to 8 feet in length should be driven just beyond the root mass. Ties of plastic, cloth, or wire inserted in a garden hose section are fastened securely to the stakes and with some slack to allow the trunk to sway slightly, while keeping the root system stabilized.

Stakes and ties should be removed after one or two growing seasons; otherwise ties may girdle and kill trees.

Surface Treatments

Mulching with pine bark or wood chips can serve several useful purposes, especially in tree lawns. By inhibiting weeds and grasses, mulch can keep away lawn mowers and weed wackers, which often seriously injure and even kill trees. A 10 inch section of 4 or 6 inch corrugated plastic pipe, slit along its length, also can protect against such injuries. Mulch improves water infiltration and retention, organic matter, and texture in the soil, thus promoting root growth. Also, the appearance is attractive. Mulch should be spread over all or most of the excavated area to a depth of 3 to 5 inches. However, it must be kept away from the trunk to prevent injury to the bark.

Other paving materials are used downtown, where mulch may be impractical. Iron tree grates are long lasting and require little maintenance, except to cut out sections that interfere with growth of the tree trunk. Grates should have small holes that will not cause pedestrians to trip, and that won't collect debris. Bricks or paving stones set in sand are sometimes used, but these tend to settle and must be reset periodically. A gravel surface is practical only if it can be contained within an edging barrier. Some paving materials permit little water to infiltrate and thus deprive trees of moisture essential to their health.

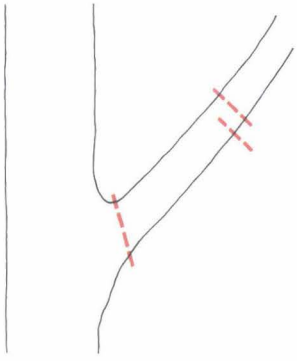
ADVICE ON TREE CARE AFTER PLANTING

The growing season just after planting is a critical period for a tree to become established and to renew growth. The tree has been placed in a different environment and much of its root system has been left in the nursery. Extra care may be needed to promote growth and maintain health, especially for those species that recover slowly. These species are designated by "R" in the Index of Tree Names and Characteristics. Monthly inspections are suggested during the first growing season to determine whether any trees need to be watered, pruned, or sprayed to control insects or diseases.

During the next three to five years, recently planted trees should be inspected annually, at least those that are slow to resume good growth. Tree care practices that may be prescribed according to the needs of each tree include pruning, fertilizing, spraying, and watering during droughts. Pruning is especially important at this time to establish a strong trunk and branch structure. Later maintenance costs then will be much less.

Watering

The soil occupied by the roots should be watered thoroughly when a tree is planted, and then weekly whenever any dry spells occur during the first spring, summer, and fall. Water should be distributed uniformly to all roots, which may extend to a depth of 12 to 18 inches. A soil dike around the perimeter of the root ball can form a basin to retain water while it soaks in, which may take one to two hours. Excessive watering can kill trees if impervious clay surrounds the planting hole and prevents drainage. Roots need oxygen as well as water.



PROPER PRUNING CUTS

Pruning

The main purpose of pruning during the first few years is to develop a balanced, well-spaced distribution of branches while maintaining the typical form of the species. Branches on the lower half of the tree that may interfere with pedestrians or vehicles should be removed before they reach ½ to 1 inch in diameter, to avoid large scars. Clusters of branches in some species, such as callery pear, may be thinned out so that branches are more evenly spaced along the trunk.

Little, if any, pruning is needed at the time of planting. The top of a tree should never be pruned except to remove a fork. Recent studies have shown that it is detrimental to reduce the length of branches and trunk, in an attempt to achieve a better balance between roots and foliage. The food manufacturing capacity of the leaves is needed to support new growth. Broken or crossing branches and weak crotches may be removed. Lower branches below one-half of the tree height may be pruned off for traffic clearance. However, no more than one-quarter of the branches should be removed in any year.

During the first decade or two, as the main structural branches of young trees develop, pruning to promote a strong framework is a sound investment. It will reduce the need for much more expensive pruning later, and the smaller cut surfaces will be exposed to infection for a much shorter time. Pruning cuts that remove entire branches should be positioned just beyond the branch collar and slanted slightly away from the trunk at the bottom. Do not cut into the swollen collar at the base of the branch, as this would delay closure of the wound. Larger branches require three cuts to prevent bark from tearing. An under-cut and a through-cut are made about one foot out from the final cut, which is made next to the branch collar (see figure). Use sharp tools that leave smooth surfaces, to promote rapid closure of wounds and lessen the chance of infection. Wound dressings are unnecessary, providing only a cosmetic benefit, and actually can be detrimental.

Fertilizing

A tree that has been planted in topsoil should not require application of fertilizer during the first year. Its principal need is for adequate soil moisture and aeration. It is normal for new growth and leaves to be smaller during the first summer or two after transplanting.

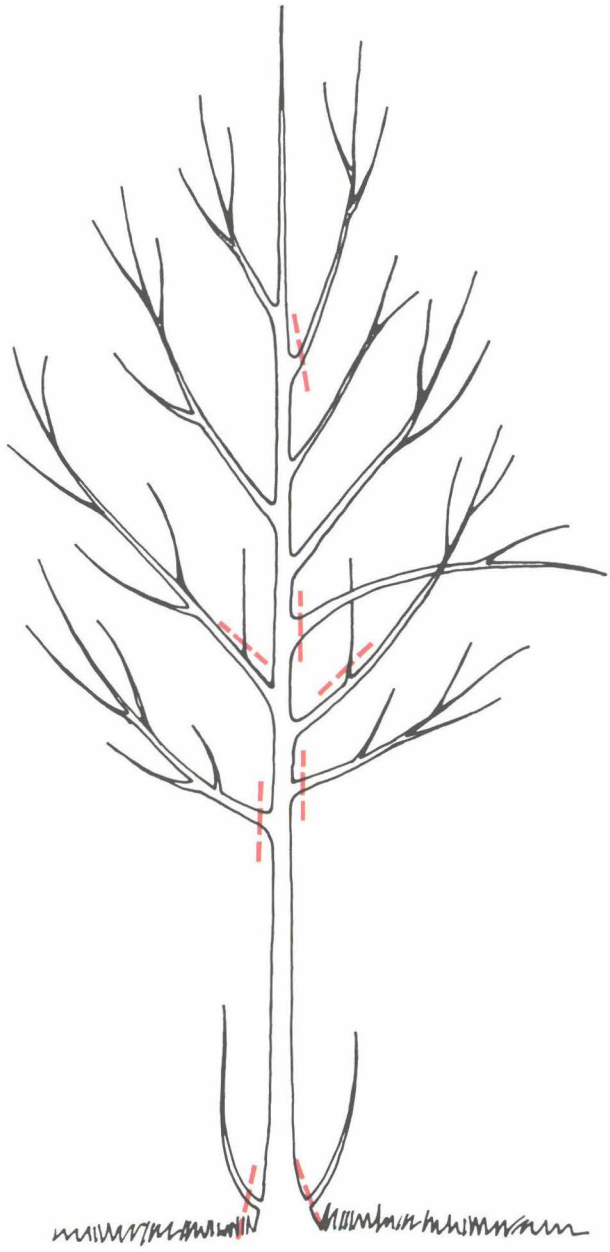
If leaves are stunted in subsequent years, especially if they are discolored, chlorotic, or mottled between the veins, a fertilizer application may be indicated. A soil test is recommended to prescribe the optimum amount and formulation of fertilizer. Otherwise money may be wasted, and excessive fertilizer could damage the tree. Contact your county extension office or state university for information on soil testing.

Controlling Diseases and Insects

Prevention should be the first line of defense against diseases and insects. Selection of resistant varieties that are well adapted to local soils and climate will lower the incidence of injuries, but not prevent them entirely. Maintaining vigorous growth by optimizing soil properties, watering, and possibly fertilizing will help plants fend off and recover from attacks. But no tree is entirely immune to all pathogens.

Diversity of species composition in a community can afford protection against calamitous damage. Losses from an epidemic such as Dutch elm disease, while distressing, can be managed if elms make up only a small percentage of all trees. It is prudent to plant as many different genera, species, and cultivars in a municipality as possible. However, it is not unwise to plant a single species or cultivar along a street. For if a problem arises, control measures can be applied more efficiently in a localized area, rather than at scattered locations.

Preparedness to combat diseases and insects is crucial, for they may strike suddenly. Advance planning should include a strategy for finding problems, identifying causal agents, and taking remedial action. Specialized expertise and qualified spray applicators may be needed on short notice, so sources of assistance should be part of the plan. Advice and publications may be obtained from county extension offices, state conservation agencies, or universities.



PROPER PRUNING CUTS

Trident Maple

Ac bu

Acer buergeranum, Tree Form

Height:	20′ to 30′ (25′ at age 30)
Width:	20′ to 30′ (25′ at age 30)
Hardiness Zone:	6 to 8
Crown:	broadly ovate, medium texture
Foliage:	2″ to 4″ three-lobed leaves, bronze new growth turns dark green, then yellow, orange, or red in fall
Flowers:	inconspicuous
Fruit:	1″ samara
Description:	Variable in habit with twisting branches, bushy unless trained to a single trunk. Slow to moderate growth, native to China and Korea, used as a street tree in Japan.
Advantages:	An attractive small tree that tolerates drought and other urban stresses. No serious pest problems known.
Limitations:	Availability limited. Ice storms or heavy snow may cause damage. Somewhat susceptible to potato leaf hopper.
Site and Culture:	Prefers well-drained, acid soil and full sun. Transplant B&B in spring. Low branching requires pruning to train trees for several years after transplanting.
Cultivars:	Only dwarf and variegated forms exist, none selected for street tree form.
Notes:	

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Trident Maple

Henry D. Gerhold, Penn State University

Norman L. Lacasse, Pennsylvania Bureau of Forestry

Henry D. Gerhold, Penn State University

Hedge Maple

Ac cm

Acer campestre

Height:	25′ to 40′ (35′ at age 30)
Width:	25′ to 40′ (35′ at age 30)
Hardiness Zone:	5 to 7
Crown:	globose to broadly ovate, dense, medium texture
Foliage:	2-4″, rounded lobes, subdued yellow in fall
Flowers:	green
Fruit:	1″ samara

Description: Variable species from Europe and western Asia commonly used in hedges. Typically has low branching and corky twigs. Growth rate is slow to moderate.

Advantages: This is one of the few smaller trees without showy flowers that fits under most utility lines. It tolerates a wide range of urban sites, and is suitable across from larger maples on the opposite side of a street. No serious diseases or insects are known.

Limitations: Low branching requires limbing up for clearance. Dense shade of closely spaced trees may inhibit grass. Winter dieback occurs in northern zones. Susceptible to *Verticillium.*

Site and Culture: Transplants readily, and is widely adaptable to acid and alkaline soils. Tolerates dry soils, compaction, and air pollutants. Full sun or light shade is preferable. May be pruned severely.

Cultivars: Some older selections have unusual ornamental traits. Hardier cultivars selected for straight trunks and better branching habit would be useful.

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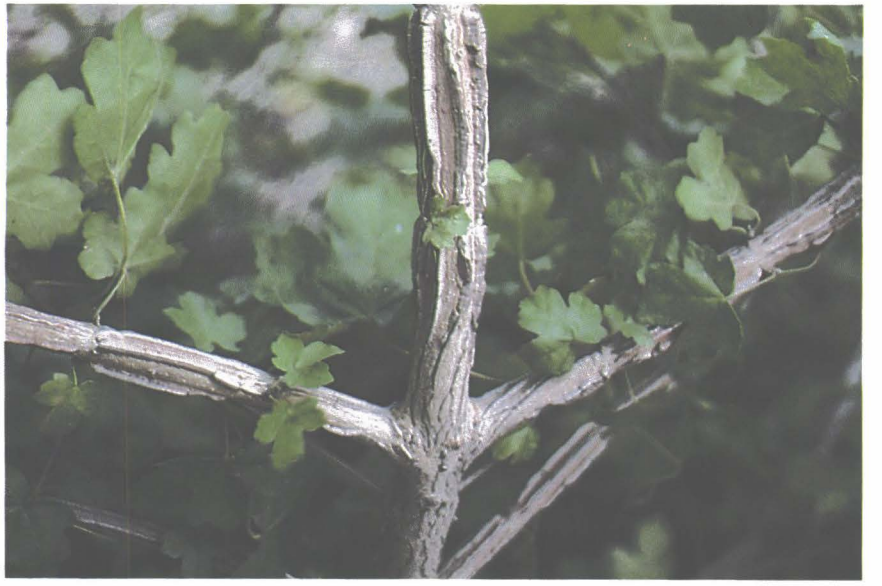
Hedge Maple

Henry D. Gerhold, Penn State University



William Hendricks, Klyn Nurseries

William H. Collins, Plant Materials Consultant

Queen Elizabeth Hedge Maple

Ac cm QE

Acer campestre **'Evelyn'**
P.P. 4392

Height:	30′ to 40′ (35′ at age 30)
Width:	25′ to 35′ (30′ at age 30)
Hardiness Zone:	6 to 8
Crown:	broadly ovate, medium texture
Foliage:	2-4″, rounded lobes, yellow in fall
Flowers:	green
Fruit:	1″ samara

Description: Moderate growth rate, more vigorous and more upright branching than the species. Branch angle is about 45 degrees, and habit is upright rather than horizontal or pendulous.

Advantages: A good street tree with improved uniformity, branching, and vigor makes it suitable for under utility lines, and opposite larger trees across the street. Tolerates a wide range of urban sites.

Limitations: Dieback has been reported in Zone 5 under some winter conditions.

Site and Culture: Species information applies. Transplants readily, and is widely adaptable to acid and alkaline soils. Tolerates dry soils, compaction, and air pollutants. Full sun or light shade is preferable. May be pruned severely.

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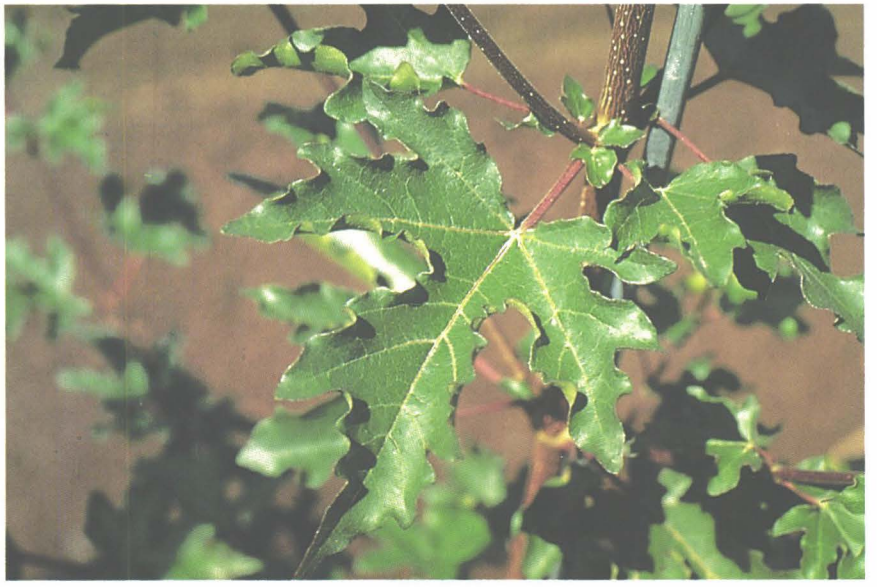
Queen Elizabeth Hedge Maple

Keith Warren, J. Frank Schmidt & Son



Keith Warren, J. Frank Schmidt & Son

Amur Maple

Ac gi

Acer ginnala Tree Form

Height:	15′ to 20′ (15′ at age 30)
Width:	15′ to 20′ (15′ at age 30)
Hardiness Zone:	3 to 7
Crown:	globose to ovate, irregular outline, medium texture
Foliage:	1½″ to 3″, three-lobed, long middle lobe, glossy dark green, variably yellow, orange, or red in fall
Flowers:	fragrant, yellowish-white panicles
Fruit:	variably red or brown in summer, abundant
Description:	A slow growing small tree or large shrub native to northern China. Though multistemmed, it may be pruned to a single stem which is seldom straight. Closely related to *Acer tataricum*.
Advantages:	Very cold-hardy. May be used as a street tree, specimen plant, hedge, or in large containers.
Limitations:	Occasionally injured by *Verticillium* wilt, bacterial blight, or other maple diseases and insects. Abundant seed can be a litter problem.
Site and Culture:	Transplants readily, preferably B&B. Grows well in full sun or light shade. Adaptable to a range of soils, but does not tolerate alkaline soil and prefers well drained soil. Pruning to produce a tree form must begin in the nursery and continue on site.
Cultivars:	'Flame' has fruits that turn bright red in summer and fiery red in fall. This somewhat variable seed-propagated cultivar is reputed to be superior as a small tree, if trained. 'Embers', introduced in 1990, was selected for red fruit and outstanding fall color. Other cultivars are being developed that have promise for use as street trees, e.g. 'Summer Splendor' which also has bright red fruit but produces less seed.
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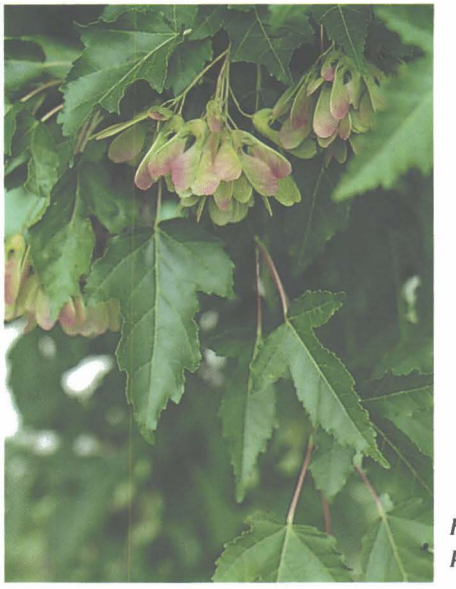
Amur Maple

Henry D. Gerhold, Penn State University



Henry D. Gerhold,
Penn State University

Donald R. Selinger, Bailey Nurseries

Paperbark Maple

Ac gr

Acer griseum

Height: 25′ to 35′ (20′ at age 30)
Width: 15′ to 30′ (15′ at age 30)
Hardiness Zone: 5 to 7

Crown: ovate or globose, variable, medium texture
Foliage: trifoliate, 2″ to 2½″ leaflets, dark green, bronze to red in fall
Flowers: inconspicuous
Fruit: 1″ to 1½″ samara

Description: A handsome, graceful tree with slender branches and cinnamon bark that exfoliates to expose rich reddish brown shades. Fall leaf color is spectacular in northern zones. Growth rate is slow. The species is native to central China.

Advantages: Best used as a specimen plant, with very attractive foliage and bark. Seldom has disease or insect problems. Could be planted in parks or along streets where space is ample and traffic is not heavy.

Limitations: Availability is limited, and plants may be expensive due to slow growth and difficult propagation. Suffers from drought and compaction. Flaky bark may invite vandalism. Does not withstand urban stress.

Site and Culture: Transplant B&B or container plants in spring. Prefers moist, well drained soils and full sun or partial shade. Extra care and pruning are needed for optimum development.

Cultivars: 'Gingerbread' is a hybrid that recently became available, and is not yet well known. Other selections have been made and should be introduced soon.

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Paperbark Maple

Henry D. Gerhold, Penn State University

Henry D. Gerhold,
Penn State University

Henry D. Gerhold, Penn State University

Greencolumn Black Maple

Ac ni Gr

Acer nigrum **'Greencolumn'**
P.P. 3722

Height: 50′ to 60′ (40′ at age 30)
Width: 20′ to 30′ (20′ at age 30)

Hardiness Zone: 5 to 8

Crown: columnar when young, then moderately ovate, medium texture
Foliage: thick, deep green leaves; apricot color in fall not spectacular
Flowers: yellow-green, emerge before leaves
Fruit: 1″ samara

Description: Selected in Iowa as a naturally occurring tree with unusual form, and introduced in 1975. It has a uniform narrow crown form. The growth rate is slow. See *Acer saccharum* species information.

Advantages: *Acer nigrum* from midwestern origins tolerates heat and drought better than *Acer saccharum.* Drought tolerance and the narrow crown are the main attributes of 'Greencolumn' that commend it as a street tree.

Limitations: Less sensitive to drought and leaf scorch than *Acer saccharum.* Other sugar maple limitations apply. Sensitivity to road salt, heat, compaction, and drought is in part responsible for widespread maple decline. *Verticillium* wilt or leaf scorch can be serious sometimes.

Site and Culture: Species information applies. Needs well drained soils with loose structure and adequate moisture. Avoid compacted or droughty soils, tree lawns less than 6' wide, and streets with heavy traffic. Susceptible to sunscald and bark cracks following heavy pruning. Good suburban tree, but not tolerant of urban stresses.

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Greencolumn Black Maple

Edward R. Hasselkus, University of Wisconsin

Keith Warren,
J. Frank Schmidt Nursery

Keith Warren, J. Frank Schmidt Nursery

Norway Maple

Ac pl

Acer platanoides

Height:	40′ to 75′ (45′ at age 30)
Width:	30′ to 60′ (35′ at age 30)
Hardiness Zone:	4 to 8
Crown:	ovate to globose, medium-coarse texture
Foliage:	4″ to 7″, green, yellow to brown in fall
Flowers:	greenish-yellow, abundant
Fruit:	2″ samara

Description: A wide-ranging species in Europe and western Asia that has been planted in many parts of North America. There is much variation in size, shape, and leaf color. Moderate to vigorous grow rate on various site conditions.

Advantages: A popular tree mainly because it survives transplanting well, grows rapidly, and provides cool shade during hot summers.

Limitations: Dense shade and surface roots interfere with lawns. Roots may damage paving and sewer lines. Susceptible to leaf scorch, *Verticillium* wilt, *Ganoderma* rot, and frost cracks. Sucking insects sometimes excrete a sticky fluid that spatters autos. Sensitive to 2,4-D. Seedlings may become a weed problem, and invade open spaces.

Site and Culture: Transplants readily. Tolerates partial shade and a wide range of soils, pH, heat, drought, and pollutants. Topping or excessive pruning should be avoided to reduce entry of disease after scorching of branches.

Cultivars: More than 80 cultivars have been selected, including some before 1800 that had bizarre growth habits or leaf shapes and colors. Those included here were chosen mainly for superior branching, trunk, leaf, and vigor traits. Carefully chosen cultivars have great advantages over trees grown from seed.

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Norway Maple

Ohio State University

Ohio State University

Ohio State University

Cleveland Norway Maple

Ac pl Cl

Acer platanoides **'Cleveland'**

Height: 45′ to 55′ (40′ at age 30)
Width: 30′ to 35′ (30′ at age 30)
Hardiness Zone: 4 to 8

Crown: ovate, dense, medium-coarse texture
Foliage: slightly larger than species, dark green, excellent yellow fall color
Flowers: greenish-yellow, abundant
Fruit: 2″ samara

Description: Selected along a street in Cleveland, Ohio and introduced about 1947. It has medium stature, a good dense branch structure, and somewhat coarse, upswinging branches in young trees.

Advantages: Improved form, branching, and stature, otherwise same as species. A popular tree mainly because it survives transplanting well, grows rapidly, and provides cool shade during hot summers.

Limitations: Species limitations apply. Dense shade and surface roots interfere with lawns. Roots may damage paving and sewer lines. Susceptible to leaf scorch, *Verticillium* wilt, *Ganoderma* rot, and frost cracks. Sucking insects sometimes excrete a sticky fluid that spatters autos. Sensitive to 2,4-D. Seedlings may become a weed problem, and invade open spaces.

Site and Culture: Species information applies. Transplants readily. Tolerates partial shade and a wide range of soils, pH, heat, drought, and pollutants. Topping or excessive pruning should be avoided to reduce entry of disease after scorching of branches.

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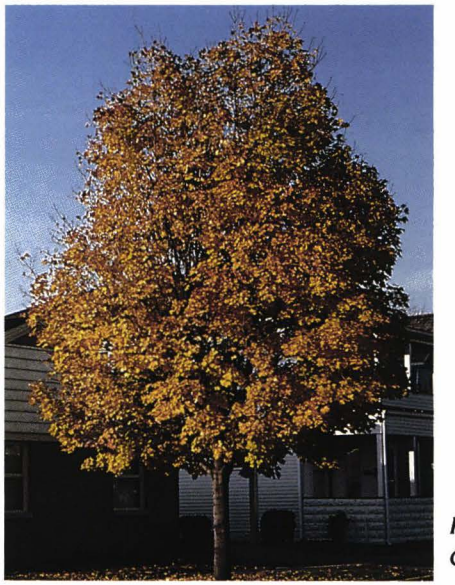
Cleveland Norway Maple

William H. Collins, Plant Materials Consultant



Ralph C. Sievert,
Cleveland City Forester

Edward R. Hasselkus, University of Wisconsin

Columnar Norway Maple

Ac pl Co

Acer platanoides **'Columnare'**

Height: 50′ to 60′ (35′ at age 30)
Width: 15′ to 20′ (15′ at age 30)
Hardiness Zone: 4 to 8

Crown: columnar, one or several columns with short branches on each, medium-coarse texture
Foliage: dark green, yellow in fall
Flowers: greenish-yellow
Fruit: 2″ samara

Description: Introduced in France in 1879, this cultivar has stood the test of time and is dependable under city conditions. Becomes more spreading with age, and somewhat variable in form. Growth rate is moderate.

Advantages: The narrow shape permits use of this tall tree where space for crown width is limited. Otherwise same as the species.

Limitations: Most species limitations apply, but dense shade, roots, and seeds are less of a problem because of the reduced crown size and slower growth. Some branches may revert to the typical habit, and require removal to maintain the columnar shape.

Site and Culture: Species information applies. Transplants readily. Tolerates partial shade and a wide range of soils, pH, heat, drought, and pollutants. Topping or excessive pruning should be avoided to reduce entry of disease after scorching of branches.

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Columnar Norway Maple

Henry D. Gerhold, Penn State University

William Flemer III,
Princeton Nurseries

Crimson King Norway Maple

Ac pl CK

Acer platanoides **'Crimson King'**
P.P. 735

Height: 35′ to 45′ (35′ at age 30)
Width: 25′ to 35′ (25′ at age 30)
Hardiness Zone: 4 to 8

Crown: broadly ovate, medium coarse texture
Foliage: purplish red leaf color retained from emergence throughout the summer, turns darker or brown in fall
Flowers: maroon-yellow
Fruit: 2″ samara

Description: A seedling of 'Schwedleri' originally selected in France for its dramatic color, it was introduced into the U.S. in 1948. It has spreading branches and its growth is slower than the species.

Advantages: One of several Norway maple cultivars which can add color to the landscape throughout the growing season. Difficult to establish in the Great Plains region.

Limitations: Reportedly more sensitive to insects and diseases than the species. Lining an entire street will produce a dark, somber appearance. Slower growing and poorly adapted where summers are hot.

Site and Culture: More difficult to transplant successfully. Should be planted high when the possibility of poor drainage exists. Otherwise similar to the species. Tolerates partial shade and a wide range of soils, pH, heat, drought, and pollutants. Topping or excessive pruning should be avoided to reduce entry of disease after scorching of branches.

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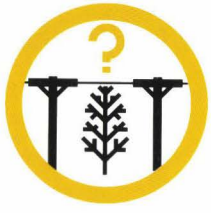

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Crimson King Norway Maple

Keith Warren, J. Frank Schmidt & Son

William Hendricks, Klyn Nurseries

Henry D. Gerhold, Penn State University

Deborah Norway Maple

Ac pl Db

Acer platanoides **'Deborah'**
P.P. 4944

Height:	55′ to 65′ (50′ at age 30)
Width:	45′ to 55′ (45′ at age 30)
Hardiness Zone:	4 to 8
Crown:	broadly ovate, medium-coarse texture
Foliage:	new leaves ruby-red maroon with crinkled, undulating margins, changing to dark green when mature; golden yellow in fall
Flowers:	greenish-yellow, abundant
Fruit:	2″ samara

Description: Selected in Canada from *'Schwedleri'* seedlings for its thick red leaves, and introduced in Oregon in 1978. Form and growth are typical of the species.

Advantages: In addition to the distinctive color, the leathery leaves are more resistant to leaf scorch. It may prove to be resistant to *Verticillium* wilt and leafhoppers, according to initial indications.

Limitations: Species limitations apply. Dense shade and surface roots interfere with lawns. Roots may damage paving and sewer lines. Susceptible to leaf scorch, *Ganoderma* rot, and frost cracks. Sucking insects sometimes excrete a sticky fluid that spatters autos. Sensitive to 2,4-D. Seedlings may become a weed problem, and invade open spaces.

Site and Culture: Species information applies. Transplants readily. Tolerates partial shade and a wide range of soils, pH, heat, drought, and pollutants. Topping or excessive pruning should be avoided to reduce entry of disease after scorching of branches.

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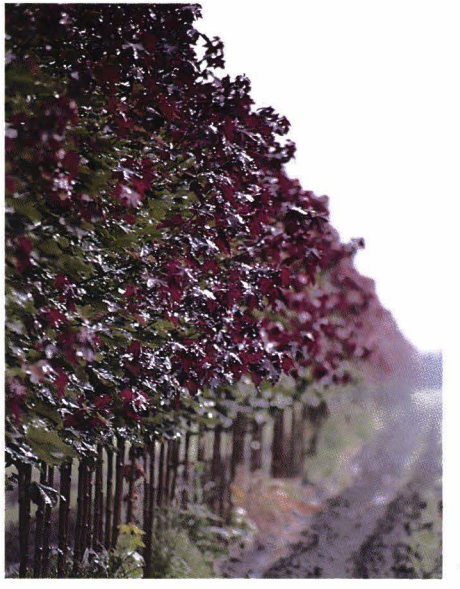
Deborah Norway Maple

Keith Warren, J. Frank Schmidt & Son

Willet N. Wandell,
Discov-Tree Research



William Hendricks,
Klyn Nurseries

Emerald Lustre Norway Maple

Ac pl EL

Acer platanoides **'Pond'**
P.P. 4837, trademarked

Height:	55′ to 65′ (50′ at age 30)
Width:	50′ to 60′ (30′ at age 30)
Hardiness Zone:	4 to 8
Crown:	globose, medium-coarse texture
Foliage:	leaves somewhat cupped, yellow in fall except in northern zones
Flowers:	greenish-yellow, abundant
Fruit:	2″ samara

Description: Selected in Minnesota and introduced in 1980. Emerald Lustre grows vigorously and has an excellent branching habit when young. It is more winter hardy than most other Norway maples. 'Pond' is an alias.

Advantages: More prolific branching habit. Improved in vigor and scorch resistance. Appears to be promising for the midwestern U.S.

Limitations: Species limitations apply. Dense shade and surface roots interfere with lawns. Roots may damage paving and sewer lines. Susceptible to leaf scorch, *Verticillium* wilt, *Ganoderma* rot, and frost cracks. Sucking insects sometimes excrete a sticky fluid that spatters autos. Sensitive to 2,4-D. Seedlings may become a weed problem, and invade open spaces.

Site and Culture: Species information applies. Transplants readily. Tolerates partial shade and a wide range of soils, pH, heat, drought, and pollutants. Topping or excessive pruning should be avoided to reduce entry of disease after scorching of branches.

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Emerald Lustre Norway Maple

Donald R. Selinger, Bailey Nurseries

Henry D. Gerhold,
Penn State University

Emerald Queen Norway Maple

Ac pl EQ

Acer platanoides **'Emerald Queen'**

Height:	60′ to 75′ (50′ at age 30)
Width:	50′ to 60′ (40′ at age 30)
Hardiness Zone:	4 to 8
Crown:	broadly ovate, dense and uniform, medium-coarse texture
Foliage:	dark green, leathery leaves; better than usual yellow fall color in most years
Flowers:	greenish-yellow, abundant
Fruit:	2″ samara
Description:	Selected as a seedling in Oregon and introduced in 1962. 'Emerald Queen' has rapid growth, a straight trunk, and a good ascending branching habit.
Advantages:	Improved growth rate, trunk, branching habit, and fall color. Resistant to leaf scorch. Among the best for midwestern U.S.
Limitations:	Species limitations apply. Dense shade and surface roots interfere with lawns. Roots may damage paving and sewer lines. Susceptible to leaf scorch, *Verticillium* wilt, *Ganoderma* rot, and frost cracks. Sucking insects sometimes excrete a sticky fluid that spatters autos. Sensitive to 2,4-D. Seedlings may become a weed problem, and invade open spaces.
Site and Culture:	Species information applies. Transplants readily. Tolerates partial shade and a wide range of soils, pH, heat, drought, and pollutants. Topping or excessive pruning should be avoided to reduce entry of disease after scorching of branches.
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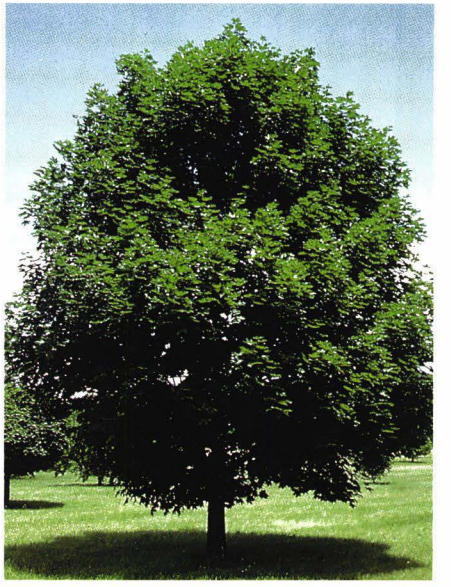
Emerald Queen Norway Maple

Keith Warren, J. Frank Schmidt & Son

Edward R. Hasselkus, Univserity of Wisconsin



Edward R. Hasselkus, University of Wisconsin

Olmsted Norway Maple

Ac pl Ol

Acer platanoides **'Olmsted'**

Height: 35′ to 45′ (35′ at age 30)
Width: 20′ to 25′ (20′ at age 30)
Hardiness Zone: 4 to 8

Crown: columnar, becoming somewhat irregular and broader with age, medium-coarse texture
Foliage: dark green, dense foliage
Flowers: greenish-yellow, abundant
Fruit: 2″ samara

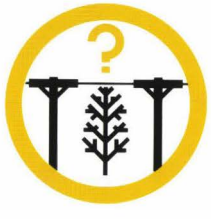
Description: Selected in Rochester, New York and introduced in 1955. 'Olmsted' has a dense upright growth habit, and becomes broader with age. Its growth rate is slower than the species. Also known as 'Improved Columnar'. Like other columnar cultivars, the branching habit is somewhat unstable, and may revert to the normal habit of growth.

Advantages: Can be used in places where space is limited, such as narrow streets. Resistant to leaf scorch.

Limitations: Species limitations apply. Dense shade and surface roots interfere with lawns. Roots may damage paving and sewer lines. Susceptible to leaf scorch, *Verticillium* wilt, *Ganoderma* rot, and frost cracks. Sucking insects sometimes excrete a sticky fluid that spatters autos. Sensitive to 2,4-D. Seedlings may become a weed problem, and invade open spaces.

Site and Culture: Species information applies. Transplants readily. Tolerates partial shade and a wide range of soils, pH, heat, drought, and pollutants. Topping or excessive pruning should be avoided to reduce entry of disease after scorching of branches.

Notes:



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Olmsted Norway Maple

Edward R. Hasselkus, University of Wisconsin

Henry D. Gerhold,
Penn State University

Henry D. Gerhold, Penn State University

Parkway Norway Maple

Ac pl Pa

Acer platanoides **'Columnarbroad'**
trademarked

Height: 40′ to 50′ (40′ at age 30)
Width: 25′ to 35′ (25′ at age 30)
Hardiness Zone: 4 to 8

Crown: moderately ovate, medium-coarse texture
Foliage: dark green, yellow in fall
Flowers: greenish-yellow, abundant
Fruit: 2″ samara

Description: Introduced in 1970, it was selected in Oregon as a faster growing and broader form of Columnar. It has a strong central leader, regular branching, and rampant growth under some conditions.

Advantages: Its intermediate growth habit requires less space than more typical Norway maple cultivars. More tolerant of *Verticillium* wilt than the species, according to inoculation experiments.

Limitations: Same as the species, except for disease resistance. Dense shade and surface roots interfere with lawns. Roots may damage paving and sewer lines. Susceptible to leaf scorch, *Ganoderma* rot, and frost cracks. Sucking insects sometimes excrete a sticky fluid that spatters autos. Sensitive to 2,4-D. Seedlings may become a weed problem, and invade open spaces.

Site and Culture: Species information applies. Transplants readily. Tolerates partial shade and a wide range of soils, pH, heat, drought, and pollutants. Topping or excessive pruning should be avoided to reduce entry of disease after scorching of branches.

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Parkway Norway Maple

Keith Warren, J. Frank Schmidt & Son

Henry D. Gerhold,
Penn State University

Henry D. Gerhold, Penn State University

Schwedler Norway Maple

Ac pl Sc

Acer platanoides **'Schwedleri'**

Height:	45′ to 60′ (45′ at age 30)
Width:	35′ to 50′ (35′ at age 30)
Hardiness Zone:	3 to 8
Crown:	broadly ovate, medium-coarse texture
Foliage:	purplish-red new leaves turn bronze-green as they mature, variably orange or yellow in the fall
Flowers:	a brownish color
Fruit:	2″ samara

Description: A widely used cultivar known in Europe since 1869. It is colorful in the spring, has spreading branches, and grows exceptionally well in northern zones, in contrast to other red-leaved cultivars.

Advantages: Provides a subtle splash of seasonal color, and tolerates urban conditions. Transplants better and is more resistant to *Verticillium* wilt than the species. Grows well in northern zones.

Limitations: Species limitations apply. Dense shade and surface roots interfere with lawns. Roots may damage paving and sewer lines. Susceptible to leaf scorch, *Ganoderma* rot, and frost cracks. Sucking insects sometimes excrete a sticky fluid that spatters autos. Sensitive to 2,4-D. Seedlings may become a weed problem, and invade open spaces.

Site and Culture: Species information applies. Transplants readily. Tolerates partial shade and a wide range of soils, pH, heat, drought, and pollutants. Topping or excessive pruning should be avoided to reduce entry of disease after scorching of branches.

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Schwedler Norway Maple

Edward R. Hasselkus, University of Wisconsin

Robert Skiera,
Milwaukee City Forester

Henry D. Gerhold, Penn State University

Summershade Norway Maple

Ac pl Sm

Acer platanoides **'Summershade'**
P.P. 1748

Height:	60′ to 75′ (50′ at age 30)
Width:	50′ to 65′ (40′ at age 30)
Hardiness Zone:	4 to 8
Crown:	broadly ovate, medium-coarse texture
Foliage:	leathery, dark green; yellow in fall
Flowers:	greenish-yellow, abundant
Fruit:	2″ samara

Description: A seedling selection from 'Erectum' in New Jersey, it was introduced in 1958. Numerous branches develop early on young trees. Growth is rapid.

Advantages: Improved in growth habit, foliage, and resistance to heat. Leafs out late, and therefore can be transplanted later. Moderately tolerant of *Verticillium* wilt.

Limitations: Most species limitations apply. Dense shade and surface roots interfere with lawns. Roots may damage paving and sewer lines. Susceptible to *Ganoderma* rot, and frost cracks. Sucking insects sometimes excrete a sticky fluid that spatters autos. Sensitive to 2,4-D. Seedlings may become a weed problem, and invade open spaces.

Site and Culture: Species information applies. Transplants readily. Tolerates partial shade and a wide range of soils, pH, heat, drought, and pollutants. Topping or excessive pruning should be avoided to reduce entry of disease after scorching of branches.

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Summershade Norway Maple

Edward R. Hasselkus, University of Wisconsin

George H. Ware, The Morton Arboretum

Superform Norway Maple

Ac pl Su

Acer platanoides **'Superform'**

Height:	50′ to 60′ (45′ at age 30)
Width:	40′ to 45′ (40′ at age 30)
Hardiness Zone:	4 to 8
Crown:	broadly ovate to globose, medium-coarse texture
Foliage:	dark green, yellow in fall
Flowers:	greenish-yellow, abundant
Fruit:	2′′ samara

Description: Introduced in 1963 and formerly known as Miller's Superform, it is noted for its straight trunk and uniform branching. Juvenile growth is slow.

Advantages: The form is symmetrical. Its reputed resistance to frost cracks does not hold up in some places.

Limitations: Besides species limitations, it tends to have slow growth and acute crotch angles which lead to problems with branching structure. Dense shade and surface roots interfere with lawns. Roots may damage paving and sewer lines. Susceptible to leaf scorch, Verticillium wilt, and *Ganoderma* rot. Sucking insects sometimes exude a sticky fluid that spatters autos. Sensitive to 2,4-D. Seedlings may become a weed problem, and invade open spaces.

Site and Culture: Species information applies. Transplants readily. Tolerates partial shade and a wide range of soils, pH, heat, drought, and pollutants. Topping or excessive pruning should be avoided to reduce entry of disease after scorching of branches. Pruning will be necessary to correct branching problems.

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Superform Norway Maple

Robert Skiera, Milwaukee City Forester

Henry D. Gerhold,
Penn State University

Red Maple

Ac ru

Acer rubrum

Height: 50′ to 75′ (40′ at age 30)
Width: 30′ to 70′ (35′ at age 30)
Hardiness Zone: 3 to 9

Crown: ovate to globose, medium texture
Foliage: 2″ to 5″, yellow to brilliant scarlet in fall
Flowers: showy red or yellow before leaves enlarge; male and female plants
Fruit: reddish samaras in late spring

Description: A colorful tree year round, with gray bark, subtle displays of flowers and fruit in spring, and brilliant splashes of red and yellow in the autumn. Native to much of the eastern U.S. and Canada, with much variation among seed sources.

Advantages: Grows vigorously where space is ample. An attractive ornamental for parks or broad streets. Its shade is less dense than other maples.

Limitations: Shallow root system with some surface roots. Somewhat chlorotic on calcareous soils. The thin bark is easily damaged. Occasional storm damage. Susceptible to *Verticillium* wilt and leafhoppers. Cultivars may suffer from delayed graft incompatibility.

Site and Culture: Transplants readily, but avoid fall planting in northern zones. Adaptable over a wide range of climate and soils, from wet to dry, but requires acid soil. Tolerates partial shade. Choose cultivars for regional adaptation, especially for northern or southern extremes. Plants propagated on their own roots are preferred to avoid delayed graft incompatibility.

Cultivars: There are great differences in crown form, earliness of fall coloration, and adaptation to climatic zones. Cultivars have advantages in control of form, color, and reduced maintenance compared to trees grown from seed. Reports of graft incompatibility (10% to 20% of trees) are more common for some cultivars than others.

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Red Maple

Ohio State University

Ohio State University

Ohio State University

Autumn Flame Red Maple

Ac ru AF

Acer rubrum **'Autumn Flame'**
P.P. 2377, trademarked

Height: 45′ to 55′ (40′ at age 30)
Width: 45′ to 55′ (40′ at age 30)
Hardiness Zone: 4 to 8

Crown: broadly ovate, medium texture
Foliage: leaves smaller than the species, yellow to scarlet early in the fall
Flowers: male, pale red
Fruit: fruitless

Description: Selected as a seedling in Oregon for dependable, superior foliage color. Introduced in 1964. Growth rate is somewhat slower than other cultivars.

Advantages: Dependable early and brilliant fall color, ranging from chrome yellow to scarlet, conditioned by climatic conditions. It develops a good branch structure, and wounds close rapidly.

Limitations: Susceptible to oyster shell scale insects under nursery conditions. Species limitations also apply. Shallow root system with some surface roots. Somewhat chlorotic on calcareous soils. The thin bark is easily damaged. Occasional storm damage. Susceptible to *Verticillium* wilt and leafhoppers. May suffer from delayed graft incompatibility.

Site and Culture: Species information applies. Transplants readily, but avoid fall planting in northern zones. Adaptable over a wide range of climate and soils, from wet to dry, but requires acid soil. Tolerates partial shade. Choose cultivars for regional adaptation, especially for northern or southern extremes. Plants propagated on their own roots are preferred to avoid delayed graft incompatibility.

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Autumn Flame Red Maple

William H. Collins, Plant Materials Consultant

Henry D. Gerhold,
Penn State University

Keith Warren, J. Frank Schmidt & Son

Bowhall Red Maple

Ac ru Bo

Acer rubrum **'Bowhall'**

Height:	40′ to 50′ (40′ at age 30)
Width:	20′ to 30′ (20′ at age 30)
Hardiness Zone:	4 to 8
Crown:	conical to broadly columnar, compact upright form, medium texture
Foliage:	orange, somewhat variable fall color
Flowers:	female, pale orange
Fruit:	same as species

Description: Discovered in Ohio and introduced in 1948. 'Bowhall' has an upright growth habit, and its crown form changes somewhat with age. It is more uniform and somewhat broader than other columnar cultivars.

Advantages: Uniformity of growth habit that is suited to moderate space limitations.

Limitations: There have been a few reports of graft incompatibility. Otherwise species limitations apply. Shallow root system with some surface roots. Somewhat chlorotic on calcareous soils. The thin bark is easily damaged. Occasional storm damage. Susceptible to *Verticillium* wilt and leafhoppers. Ability to compartmentalize wounds is below average.

Site and Culture: Species information applies. Transplants readily, but avoid fall planting in northern zones. Adaptable over a wide range of climate and soils, from wet to dry, but requires acid soil. Tolerates partial shade. Choose cultivars for regional adaptation, especially for northern or southern extremes. Plants propagated on their own roots are preferred to avoid delayed graft incompatibility.

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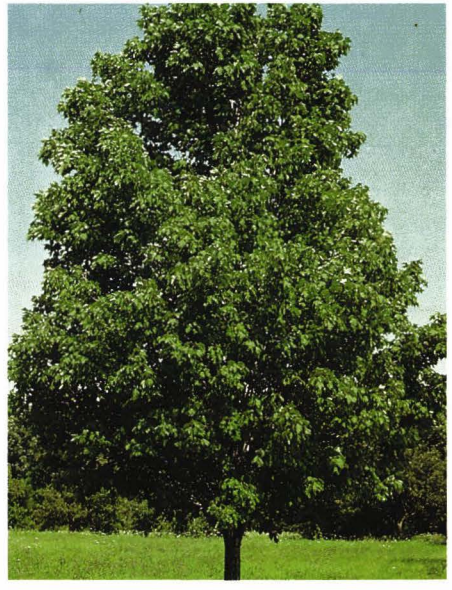
Bowhall Red Maple

Edward R. Hasselkus, University of Wisconsin

Edward R. Hasselkus,
University of Wisconsin



Keith Warren,
J. Frank Schmidt & Son

Karpick Red Maple

Ac ru Ka

Acer rubrum **'Karpick'**

Height:	40′ to 50′ (40′ at age 30)
Width:	20′ to 25′ (20′ at age 30)
Hardiness Zone:	4 to 8
Crown:	narrowly ovate, medium texture
Foliage:	orange, somewhat variable fall color
Flowers:	male
Fruit:	none observed

Description: The parent tree was discovered in New York as a native tree, and introduced about 1974. 'Karpick' has rapid, uniform growth, distinct red twigs, a narrow crown, and upright, dense branching.

Advantages: Uniform, rapid growth that is suited to moderate space limitations.

Limitations: Some graft incompatibility has been noted. Species limitations also apply. Shallow root system with some surface roots. Somewhat chlorotic on calcareous soils. The thin bark is easily damaged. Occasional storm damage. Susceptible to *Verticillium* wilt and leafhoppers. Availability is limited.

Site and Culture: Species information applies. Transplants readily, but avoid fall planting in northern zones. Adaptable over a wide range of climate and soils, from wet to dry, but requires acid soil. Tolerates partial shade. Choose cultivars for regional adaptation, especially for northern or southern extremes. Plants propagated on their own root are preferred to avoid delayed graft incompatibility.

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Karpick Red Maple

Ronald J. Walkowiak, formerly Schichtel's Nursery

Henry D. Gerhold,
Penn State University

Keith Warren,
J. Frank Schmidt & Son

Northwood Red Maple

Ac ru No

Acer rubrum **'Northwood'**
P.P. 5053, trademarked

Height: 50′ to 60′ (40′ at age 30)
Width: 40′ to 50′ (35′ at age 30)
Hardiness Zone: 3 to 8

Crown: ovate, somewhat irregular, medium texture
Foliage: medium to dark green, subdued orange to red-orange in fall
Flowers: male, orange-red
Fruit: seedless

Description: Selected from a northern Minnesota seed source and introduced in 1980. Has ascending branches, a straight trunk, moderate growth rate, and excellent cold hardiness.

Advantages: Probably the hardiest red maple cultivar. Has a strong branching habit.

Limitations: Fall color is subdued in warmer regions. Most species limitations apply. Shallow root system with some surface roots. Somewhat chlorotic on calcareous soils. Thin bark is subject to mechanical damage. Susceptible to leafhoppers. May suffer from delayed graft incompatibility unless plants are propagated on their own roots.

Site and Culture: Species information applies. Transplants readily, but avoid fall planting in northern zones. Adaptable over a wide range of climate and soils, but requires acid soil; especially suited to northern zones, rather than southern. Tolerates partial shade. Plants propagated on their own roots are preferred to avoid graft incompatibility.

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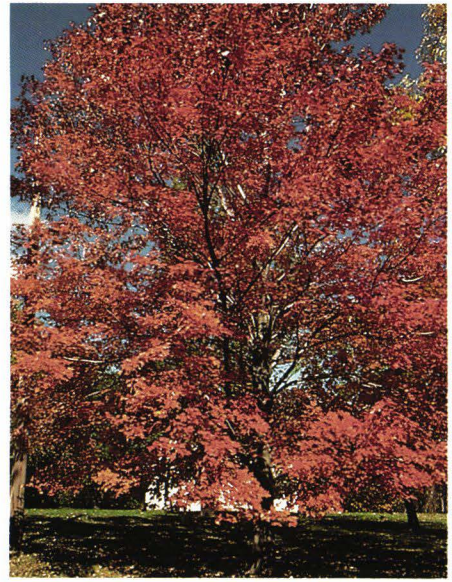
Northwood Red Maple

Keith Warren, J. Frank Schmidt & Son

Henry D. Gerhold,
Penn State University



Donald R. Selinger,
Bailey Nurseries

October Glory Red Maple

Ac ru OG

Acer rubrum **'PNI 0268'**
P.P. 2116, trademarked

Height:	50′ to 60′ (40′ at age 30)
Width:	40′ to 50′ (35′ at age 30)
Hardiness Zone:	5 to 8
Crown:	broadly ovate, medium texture
Foliage:	shiny green leaves, held longer in the fall than most cultivars, the usual crimson-red fall color may turn brown suddenly after frost.
Flowers:	female, bright red
Fruit:	same as species
Description:	An offspring from *'Columnare'*, it was selected in New Jersey for outstanding fall color and uniform growth habit, and was introduced in 1961.
Advantages:	Suited to residential landscapes and municipal sites where space is ample.
Limitations:	Less cold hardy than most other cultivars, but better adapted to warmer zones. Storms may cause limb breakage. Wounds close more slowly than on other cultivars. Species limitations also apply. Shallow root system with some surface roots. Somewhat chlorotic on calcareous soils. The thin bark is easily damaged. Susceptible to *Verticillium* wilt and leafhoppers. May suffer from delayed graft incompatibility.
Site and Culture:	Species information applies. Transplants readily, but avoid fall planting in northern zones. Adaptable over a wide range of climate and soils, from wet to dry, but requires acid soil. Tolerates partial shade. Choose cultivars for regional adaptation, especially for northern or southern extremes. Plants propagated on their own roots are preferred to avoid delayed graft incompatibility.
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October Glory Red Maple

Keith Warren, J. Frank Schmidt & Son

Edward R. Hasselkus,
University of Wisconsin

Henry D. Gerhold,
Penn State University

Red Sunset Red Maple

Ac ru RS

Acer rubrum **'Franksred'**
Trademarked

Height: 50′ to 60′ (45′ at age 30)
Width: 40′ to 50′ (35′ at age 30)
Hardiness Zone: 4 to 8

Crown: broadly ovate, medium texture
Foliage: glossy thick leaves persist late in fall, with orange-red to brilliant red color
Flowers: female, abundant red flowers
Fruit: bright red in early spring

Description: Selected in Oregon and introduced in 1966. Red Sunset is one of the best in dense, upright crown form and intensely red fall foliage. 'Franksred' is an alias.

Advantages: It develops good branch structure and has a longer display of fall color. One of the best red maples for midwestern U.S. Ability to compartmentalize wounds is above average.

Limitations: Susceptible to wind driven road salt. Leaf scorch occurs in warm climates. Species limitations also apply. Shallow root system with some surface roots. Somewhat chlorotic on calcareous soils. The thin bark is easily damaged. Occasional storm damage. Susceptible to *Verticillium* wilt and leafhoppers. Cultivars may suffer from delayed graft incompatibility.

Site and Culture: Species information applies. Transplants readily, but avoid fall planting in northern zones. Adaptable over a wide range of climate and soils, from wet to dry, but requires acid soil. Tolerates partial shade. Choose cultivars for regional adaptation, especially for northern or southern extremes. Plants propagated on their own roots are preferred to avoid delayed graft incompatibility.

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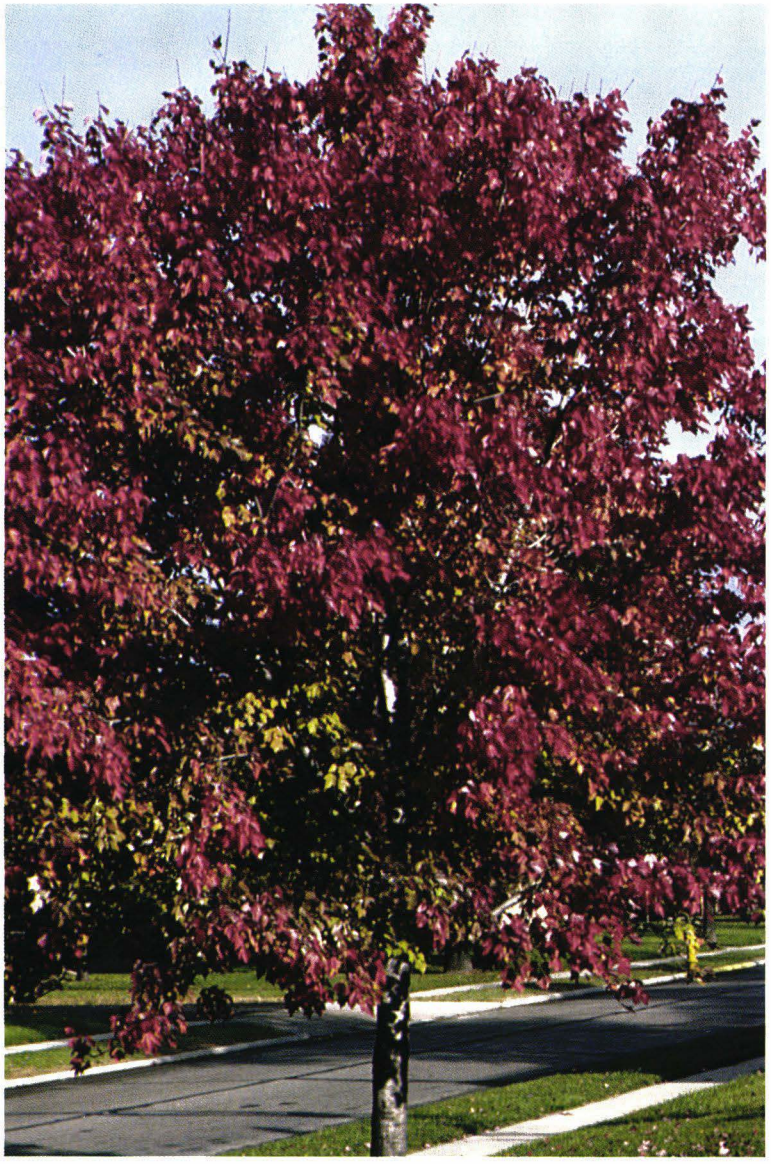
Red Sunset Red Maple



William H. Collins, Plant Materials Consultant

Keith Warren,
J. Frank Schmidt & Son

Keith Warren, J. Frank Schmidt & Son

Silver Maple

Ac sa

Acer saccharinum

Height:	60′ to 90′ (50′ at age 30)
Width:	50′ to 80′ (45′ at age 30)
Hardiness Zone:	3 to 9
Crown:	broadly ovate, irregular, medium-coarse texture
Foliage:	3″ to 6″, silvery beneath, yellow in fall
Flowers:	greenish or reddish yellow
Fruit:	large samaras in late spring, large crops in most years

Description: A fast growing tree subject to breakage because of the branch structure. It is held in disfavor by municipal arborists and utility foresters. Native to wet or moist sites throughout much of eastern North America. Smooth gray bark becomes scaly when older.

Advantages: Widely adaptable but useful only on spacious sites where maintenance problems can be accommodated. Makes an impact on the landscape within a few years after planting.

Limitations: Vigorous growth and storm breakage lead to high maintenance costs for trimming and cleanup. Mature trees may be very costly to remove due to large size of trunk. Susceptible but seldom severely damaged by many diseases and insects, including anthracnose, leafspots, cankers, trunk decay, leaf-feeding insects, borers, and physiological disorders. Surface roots may damage sidewalks and sewers. Sometimes chlorotic on calcareous soils. Seedlings can be a nuisance.

Site and Culture: One of the easiest species to grow on many soil types, but avoid high pH. Tolerates adverse urban conditions. Timely and frequent pruning is needed to develop strong branch structure. Keep away from sidewalks and jointed pipes.

Cultivars: Several cultivars of this species such as 'Silver Queen' and 'Skinner's Cutleaf', and hybrids (*Acer* x *freemanii*) with red maple, have been selected for improved branching habit. These deserve to be tried on spacious sites away from utility lines.

Notes: Some municipalities prohibit the planting of this species as a street tree.

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Silver Maple

Ohio State University

Ohio State University

Ohio State University

Sugar Maple (and Black Maple) Ac sc

Acer saccharum (and *A. nigrum*)

Height: 60′ to 80′ (45′ at age 30)
Width: 40′ to 70′ (40′ at age 30)
Hardiness Zone: 3 to 7

Crown: ovate, regular ascending branches, medium texture
Foliage: 3″ to 5″; sugar maple is brilliant yellow, orange, or red in fall; black maple is more subdued
Flowers: yellow-green, emerge before leaves
Fruit: 1″ samara

Description: Sugar maple is native to moist, cool sites in central and eastern U.S. and Canada. On spacious sites it is a most attractive shade tree. Foliage is dense and develops spectacular autumn colors. Smooth gray bark becomes furrowed with age, ultimately with long, scaly plates. Growth rate is slow to medium. Black maple is closely related and very similar to sugar maple in most traits, but is a separate species.

Advantages: Pleasing growth habit and colors make for an ideal tree in parks or broad tree lawns. Shade tolerance permits it to be interplanted among older trees.

Limitations: Sensitivity to road salt, heat, compaction, and drought is in part responsible for widespread maple decline. *Verticillium* wilt or leaf scorch can be serious sometimes. *Acer nigrum* from midwestern origins is more heat and drought tolerant.

Site and Culture: Needs well drained soils with loose structure and adequate moisture. Avoid compacted or droughty soils, tree lawns less than 6′ wide, and streets with heavy traffic. Susceptible to sunscald and bark cracks following heavy pruning. Good suburban tree, but not tolerant of urban stresses.

Cultivars: Trees grown from seed obtained from similar or colder, drier climatic zones are best. Cultivars are useful mainly for controlling crown shape and color, and some are believed to be more tolerant of urban conditions.

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Sugar Maple (and Black Maple)

Ohio State University

Ohio State University

Ohio State University

Bonfire Sugar Maple

Ac sc Bn

Acer saccharum **'Bonfire'**
P.P. 3817

Height: 50′ to 70′ (50′ at age 30)
Width: 40′ to 60′ (40′ at age 30)
Hardiness Zone: 4 to 8

Crown: broadly ovate, medium texture
Foliage: large leaves, brilliant orange-red in fall
Flowers: yellow-green, emerge before leaves
Fruit: 1″ samara.

Description: An offspring of *'Columnare'* selected in New Jersey and introduced in 1975. Its broad spreading crown and rapid growth require a spacious setting.

Advantages: It is vigorous, has good heat tolerance and bright fall colors.

Limitations: Development of the crown structure is not as good as with some other cultivars. Species limitations also apply. Sensitivity to road salt, heat, compaction, and drought is in part responsible for widespread maple decline. *Verticillium* wilt or leaf scorch can be serious sometimes.

Site and Culture: Species information applies. Needs well drained soils with loose structure and adequate moisture. Avoid compacted or droughty soils, tree lawns less than 6' wide, and streets with heavy traffic. Susceptible to sunscald and bark cracks following heavy pruning. Good suburban tree, but not tolerant of urban stresses.

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Bonfire Sugar Maple

William Flemer III, Princeton Nurseries

Keith Warren,
J. Frank Schmidt & Son

Commemoration Sugar Maple

Ac sc Cm

Acer saccharum **'Commemoration'**
P.P. 5079

Height:	50′ to 60′ (50′ at age 30)
Width:	30′ to 35′ (35′ at age 30)
Hardiness Zone:	5 to 8
Crown:	moderately conical, dense crown develops early, medium texture
Foliage:	dark lustrous leaves resist tatter; orange, pink, and red fall color occurs two weeks before the species
Flowers:	yellow-green, emerge before leaves
Fruit:	1″ samara
Description:	Selected in Illinois and introduced in 1983. It has rapid growth, dark green leaves, and dense branching.
Advantages:	Appropriate for suburban conditions and resistant to leaf tatter and scorch, excellent fall color.
Limitations:	Less sensitive to heat, otherwise, species limitations apply. Sensitivity to road salt, heat, compaction, and drought is in part responsible for widespread maple decline. *Verticillium* wilt or leaf scorch can be serious sometimes. Some storm breakage due to weak crotch angles has been reported.
Site and Culture:	Species information applies. Needs well drained soils with loose structure and adequate moisture. Avoid compacted or droughty soils, tree lawns less than 6' wide, and streets with heavy traffic. Susceptible to sunscald and bark cracks following heavy pruning. Good suburban tree, but not tolerant of urban stresses.
Notes:	

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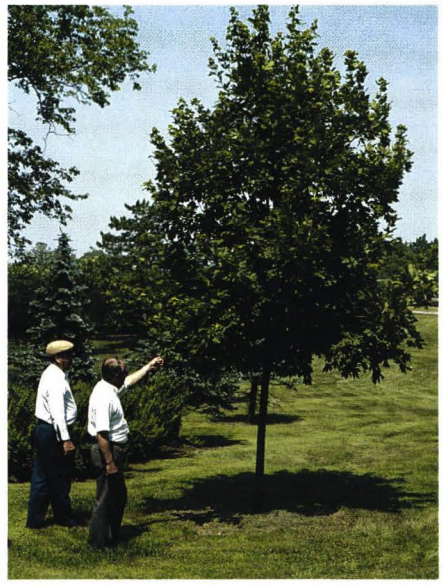
Commemoration Sugar Maple

Willet N. Wandell, Discov-Tree Research



Henry D. Gerhold,
Penn State University

Willet N. Wandell, Discov-Tree Research

Goldspire Sugar Maple

Ac sc Go

Acer saccharum **'Goldspire'**
P.P. 2917

Height:	40′ to 50′ (40′ at age 30)
Width:	12′ to 15′ (13′ at age 30)
Hardiness Zone:	4 to 8
Crown:	narrowly conical to columnar, dense and compact, medium texture
Foliage:	leathery dark green leaves; bright yellow in fall
Flowers:	yellow-green, emerge before leaves
Fruit:	1″ samara

Description: A narrow, compact tree with brilliant fall color, produced by crossing *'Monumentale'* x *'Columnare'*. It was selected in New Jersey, and introduced in 1969. Growth rate is slower than the species.

Advantages: Rapidly forms a narrow compact tree that is moderately resistant to leaf scorch.

Limitations: Species limitations apply. Sensitivity to road salt, heat, compaction, and drought is in part responsible for widespread maple decline. *Verticillium* wilt can be serious sometimes.

Site and Culture: Species information applies. Needs well drained soils with loose structure and adequate moisture. Avoid compacted or droughty soils, tree lawns less than 6′ wide, and streets with heavy traffic. Susceptible to sunscald and bark cracks following heavy pruning. Good suburban tree, but not tolerant of urban stresses.

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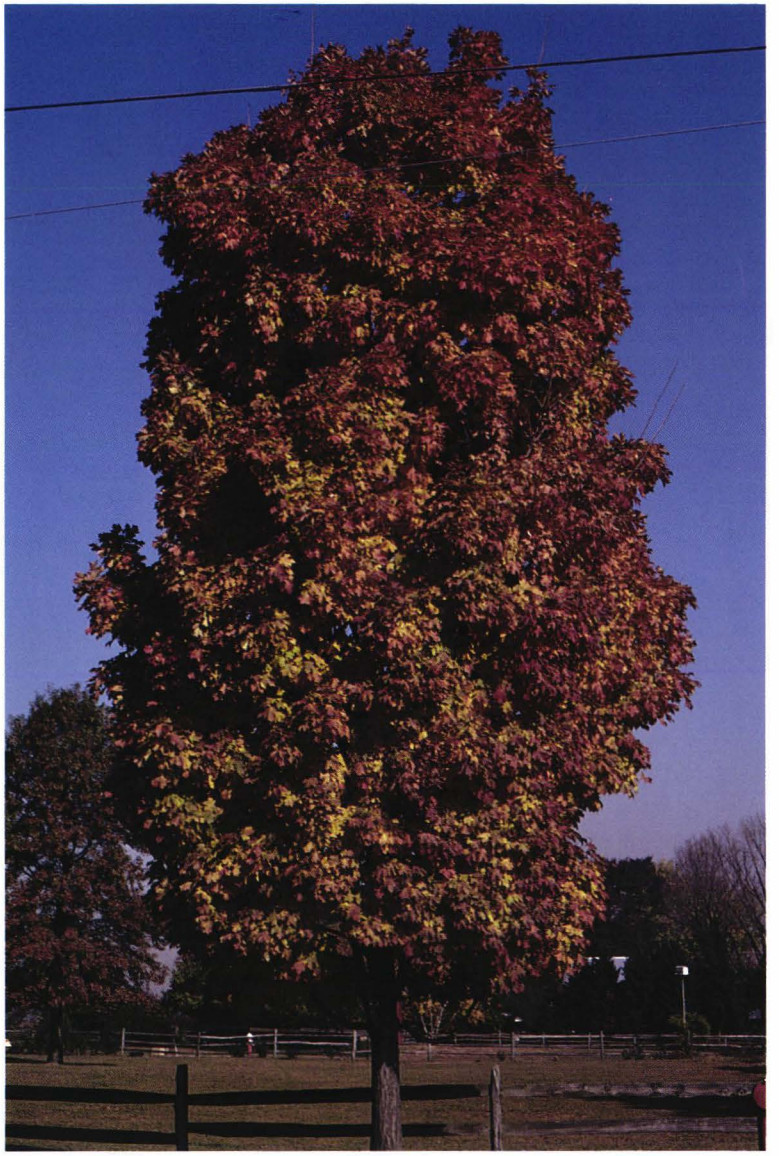
Goldspire Sugar Maple



William Flemer III, Princeton Nurseries

Henry D. Gerhold,
Penn State University

Green Mountain Sugar Maple

Ac sc GM

Acer saccharum **'PNI 0285'**
P.P. 2339, trademarked

Height:	50′ to 75′ (45′ at age 30)
Width:	40′ to 60′ (35′ at age 30)
Hardiness Zone:	4 to 8
Crown:	ovate, medium texture
Foliage:	leathery dark green leaves; yellow, apricot, and red fall colors
Flowers:	yellow-green, emerge before leaves
Fruit:	1″ samara.
Description:	Uniform and more vigorous growth than the species, with an upright habit. It was produced by controlled pollination, selected in New Jersey, and introduced in 1964.
Advantages:	Good foliage color in summer and fall, and moderate resistance to leaf scorch.
Limitations:	Species limitations apply. Sensitivity to road salt, heat, compaction, and drought is in part responsible for widespread maple decline. *Verticillium* wilt can be serious sometimes.
Site and Culture:	Species information applies. Needs well drained soils with loose structure and adequate moisture. Avoid compacted or droughty soils, tree lawns less than 6′ wide, and streets with heavy traffic. Susceptible to sunscald following heavy pruning. Good suburban tree but not a good urban tree.
Notes:	

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Green Mountain Sugar Maple

William Flemer III, Princeton Nurseries

William Hendricks, Klyn Nurseries

Edward R. Hasselkus, University of Wisconsin

Legacy Sugar Maple

Ac sc Lg

Acer saccharum **'Legacy'**
P.P. 4979, trademarked

Height: 50′ to 60′ (50′ at age 30)
Width: 30′ to 35′ (30′ at age 30)
Hardiness Zone: 4 to 8

Crown: moderately conical, dense, medium texture
Foliage: thick, dark green leaves; shades of orange, pink, and red develop in fall
Flowers: yellow-green, emerge before leaves
Fruit: 1″ samara

Description: After establishment it rapidly develops a dense, spreading crown that tolerates heat and withstands wind. It originated in the western part of the species range and was introduced in 1983.

Advantages: Rapid growth, resistance to heat scorch and leaf tatter, good fall color. Drought tolerant under suburban conditions.

Limitations: Less sensitive to heat, otherwise, species limitations apply. Sensitivity to road salt, heat, compaction, and drought is in part responsible for widespread maple decline. *Verticillium* wilt or leaf scorch can be serious sometimes.

Site and Culture: Species information applies. Needs well drained soils with loose structure and adequate moisture. Avoid compacted or droughty soils, tree lawns less than 6′ wide, and streets with heavy traffic. Susceptible to sunscald and bark cracks following heavy pruning. Good suburban tree, but not tolerant of urban stresses.

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Legacy Sugar Maple

Willet N. Wandell, Discov-Tree Research

Henry D. Gerhold,
Penn State University

Willet N. Wandell, Discov-Tree Research

Seneca Chief Sugar Maple

Ac sc SC

Acer saccharum **'Seneca Chief'**

Height:	60′ to 70′ (45′ at age 30)
Width:	40′ to 45′ (35′ at age 30)
Hardiness Zone:	4 to 7
Crown:	narrowly conical to ovate, medium texture
Foliage:	large, dark green leaves, turn golden orange in fall
Flowers:	yellow-green, emerge before leaves
Fruit:	1″ samara

Description: Has a vigorous and compact growth habit, with darker, larger leaves than the species. It was selected in New York and was introduced in 1979.

Advantages: Vigor, strong crown form, dark green foliage.

Limitations: Species limitations apply. Sensitivity to road salt, heat, compaction, and drought is in part responsible for widespread maple decline. *Verticillium* wilt or leaf scorch can be serious sometimes.

Site and Culture: Species information applies. Needs well drained soils with loose structure and adequate moisture. Avoid compacted or droughty soils, tree lawns less than 6′ wide, and streets with heavy traffic. Susceptible to sunscald and bark cracks following heavy pruning. Good suburban tree, but not tolerant of urban stresses..

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Seneca Chief Sugar Maple

Ronald J. Walkowiak, formerly Schichtel's Nursery

Tatarian Maple

Ac ta

Acer tataricum Tree Form

Height:	15′ to 25′ (20′ at age 30)
Width:	15′ to 25′ (18′ at age 30)
Hardiness Zone:	3 to 6
Crown:	globose or ovate, medium texture
Foliage:	2″ to 4″, unlobed or 3- to 5-lobed, soft green leaves, turning yellow in fall, sometimes with reddish tints
Flowers:	greenish-white in erect panicles
Fruit:	1″ samara, turning green to red in summer on most trees
Description:	A spreading small tree or large shrub, native to southeastern Europe and southwestern Asia. It resembles *Acer ginnala*, to which it is closely related. Growth rate is slow to medium.
Advantage:	Tolerates alkalinity and drought better then *Acer ginnala.* Samaras are sometimes quite showy.
Limitations:	Susceptible to *Verticillium* wilt and cankers. Seldom serious disease or insect problems. Availability has been limited, but is increasing.
Site and Culture:	Transplants readily, preferably in spring. Adaptable to a wide range of urban sites, including alkaline soils. Pruning is needed to maintain tree form with a single trunk.
Cultivars:	'Rubrum' has blood-red leaves in the fall.
Notes:	

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Tatarian Maple

Henry D. Gerhold, Penn State University

Henry D. Gerhold, Penn State University

Henry D. Gerhold, Penn State University

Armstrong Freeman Maple

Ac xf Ar

Acer x freemanii **'Armstrong'**

Height: 50′ to 60′ (45′ at age 30)
Width: 20′ to 25′ (15′ at age 30)
Hardiness Zone: 4 to 8

Crown: columnar, upright branching, medium texture
Foliage: 5-lobed with silvery underside, more like silver than red maple, often has subdued yellow color in fall
Flowers: inconspicuous
Fruit: samaras in late spring

Description: The original tree was discovered in Ohio. 'Armstrong' was introduced about 1951, and continues to be listed as a red maple, although it is now believed to be a hybrid between red and silver maples. It has silver-gray bark, grows rapidly, and retains an upright habit, though spreading somewhat with age.

Advantages: Suited to narrow spaces, tolerates heat, and is much more vigorous than columnar sugar maple or columnar Norway maple.

Limitations: Sometimes develops graft incompatibility, possibly depending on which understock is used for this presumed hybrid. Wound closure is slower than on red maple cultivars.

Site and Culture: Probably similar to *A. rubrum*. Species information applies. Transplants readily, but avoid fall planting in northern zones. Adaptable over a wide range of climate and soils, from wet to dry, but requires acid soil. Tolerates partial shade. Plants propagated on their own roots are preferred to avoid delayed graft incompatibility.

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Armstrong Freeman Maple

William Hendricks, Klyn Nurseries

William Hendricks,
Klyn Nurseries

Henry D. Gerhold, Penn State University

Autumn Blaze Freeman Maple

Ac xf AB

Acer x freemanii **'Jeffersred'**
P.P. 4864, trademarked

Height: 50′ to 60′ (50′ at age 30)
Width: 40′ to 50′ (40′ at age 30)
Hardiness Zone: 4 to 8

Crown: broadly ovate, medium texture
Foliage: green leaves deeply lobed, consistently orange-red in fall
Flowers: female
Fruit: nearly seedless

Description: Has a dense crown with ascending branches and a central leader. A hybrid between *A. rubrum* x *A. saccharinum* selected in Ohio in the late 1960's.

Advantages: Fall color is dependable and long lasting. Improved branch habit and less prone to storm damage, compared to silver maple.

Limitations: Most traits probably are similar to *A. rubrum*. Shallow root system with some surface roots. Thin bark is easily damaged. Susceptible to leaf hoppers and bacterial blight. May suffer from delayed graft incompatibility.

Site and Culture: Probably similar to *A. rubrum*. Transplants readily, but avoid fall planting in northern zones. Adaptable over a wide range of climate and soils, from wet to dry, but requires acid soil. Tolerates partial shade. Plants propagated on their own roots are preferred to avoid graft incompatibility.

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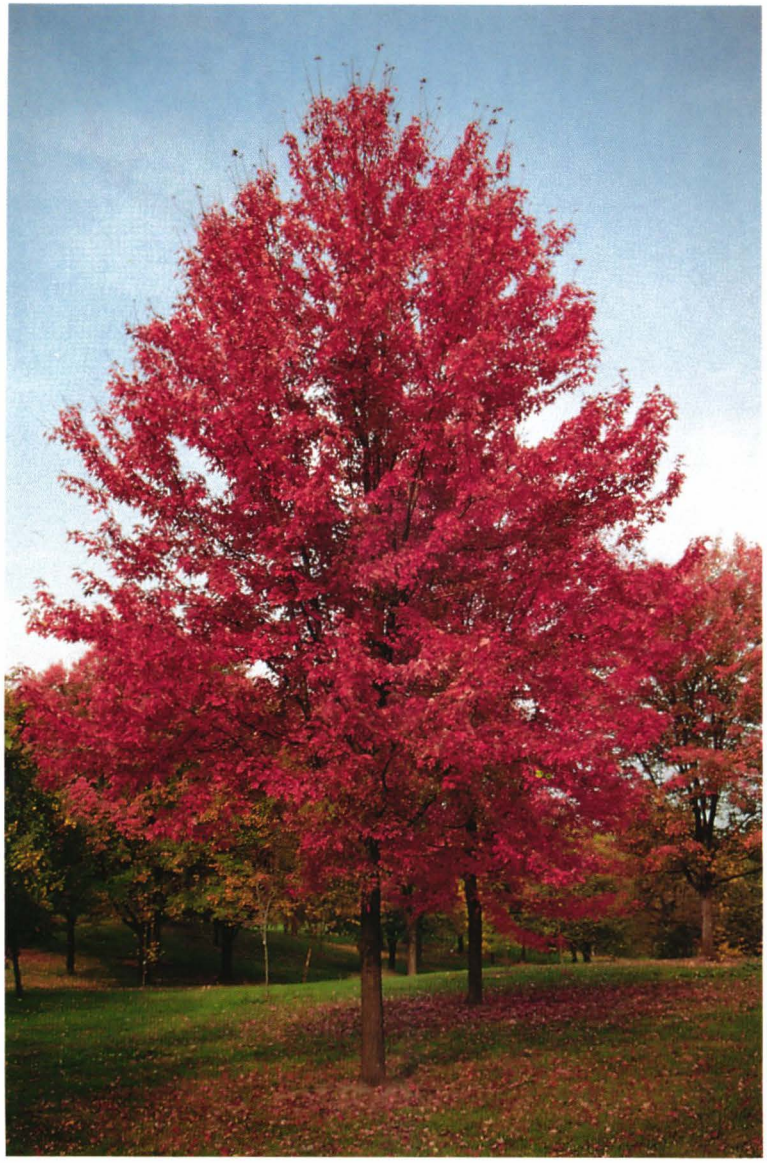
Autumn Blaze Freeman Maple



Henry D. Gerhold, Penn State University

Henry D. Gerhold,
Penn State University

Henry D. Gerhold,
Penn State University

Celebration Freeman Maple

Ac xf Cl

Acer x *freemanii* **'Celzam'**
P.P. 7279

Height: 45′ to 65′ (45′ at age 30)
Width: 25′ to 40′ (30′ at age 30)
Hardiness Zone: 4 to 8

Crown: ovate, upright habit, medium texture
Foliage: dense foliage has a red cast around leaf edge, turns yellow with a red margin in the fall
Flowers: male, red
Fruit: seedless

Description: Has uniform growth, a compact upright crown, and strong crotch angles. It is a cross of *A. rubrum* x *A. saccharinum* which originated in Ohio and was introduced in 1987.

Advantages: Disease resistant foliage, improved branching habit, and less prone to storm damage, compared to silver maple. Resistance to chlorosis on calcareous soils.

Limitations: Probably is similar to *A. rubrum*. Shallow root system with some surface roots. The thin bark is easily damaged. Susceptible to *Verticillium* wilt and leafhoppers. May suffer from delayed graft incompatibility.

Site and Culture: Probably is similar to *A. rubrum*. Transplants readily, but avoid fall planting in northern zones. Adaptable over a wide range of climate and soils, from wet to dry, but requires acid soil. Tolerates partial shade. Plants propagated on their own roots are preferred to avoid delayed graft incompatibility.

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Celebration Freeman Maple

Henry D. Gerhold, Penn State University

James W. Zampini,
Lake County Nursery

Henry D. Gerhold, Penn State University

Scarlet Sentinel Freeman Maple

Ac xf SS

Acer x *freemanii* **'Scarsen'**
P.P. 3109

Height: 50′ to 70′ (40′ at age 20)
Width: 25′ to 35′ (20′ at age 20)
Hardiness Zone: 4 to 8

Crown: narrowly ovate, ascending branches, medium texture
Foliage: rich green leaves turn red or yellow in fall
Flowers: female, bright red
Fruit: none observed

Description: Selected in Ohio, presumably from a cross of *A. rubrum* x *A. saccharinum,* and introduced in 1972. Vigorous growth extends late into the season. Has good upright branch structure and silver-gray bark.

Advantages: Improved branch structure and less prone to storm damage, compared to silver maple. Adapted to calcareous soils.

Limitations: Probably is similar to *A. rubrum.* Shallow root system with some surface roots. The thin bark is easily damaged. Susceptible to *Verticillium* wilt and leafhoppers. May suffer from delayed graft incompatibility.

Site and Culture: Probably is similar to *A. rubrum.* Transplants readily, but avoid fall planting in northern zones. Adaptable over a wide range of climate and soils, from wet to dry, but requires acid soil. Tolerates partial shade. Plants propagated on their own roots are preferred to avoid delayed graft incompatibility.

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Scarlet Sentinel Freeman Maple

Keith Warren, J. Frank Schmidt & Son

Keith Warren,
J. Frank Schmidt & Son

Keith Warren,
J. Frank Schmidt & Son

Norwegian Sunset Shantung Hybrid Maple

Ac xx NS

Acer truncatum x A. platanoides **'Keithsform'**
P.P. 7529, trademarked

Height: 35′ to 45′ (35′ at age 30)
Width: 25′ to 35′ (25′ at age 30)
Hardiness Zone: 4 to 8

Crown: upright ovate, medium texture
Foliage: 3″ to 6″, glossy dark green, orange-red to red in fall
Flowers: greenish-yellow
Fruit: 1½″ samara

Description: A naturally occurring hybrid of Shantung maple and Norway maple selected in Oregon for fall color, branching, and fast growth. Has uniform branching and crown shape. Introduced in 1989.

Advantages: Has brighter fall colors and finer branching than Norway maple. The parentage suggests the mature size will be smaller than Norway maple and more heat tolerant.

Limitations: None known yet. Mature size is uncertain. Refer to *Acer platanoides* for possible problems.

Site and Culture: Transplants readily. Tolerates partial shade and a wide range of soils, pH, heat, drought, and pollutants.

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Norwegian Sunset Shantung Hybrid Maple

Henry D. Gerhold, Penn State University

Keith Warren,
J. Frank Schmidt & Son

Keith Warren,
J. Frank Schmidt & Son

Pacific Sunset Shantung Hybrid Maple

Ac xx PS

Acer truncatum x A. platanoides **'Warrenred'**
P.P. 7433, trademarked

Height: 30′ to 40′ (30′ at age 30)
Width: 25′ to 35′ (25′ at age 30)
Hardiness Zone: 4 to 8

Crown: upright ovate, medium texture
Foliage: 3″ to 6″, glossy dark green, orange-red to bright red in fall
Flowers: greenish-yellow
Fruit: 1½″ samara

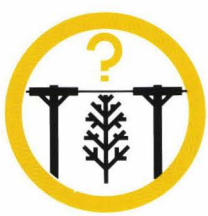
Description: A naturally occurring hybrid of Shantung maple and Norway maple selected in Oregon for fall color, branching, and fast growth. Branch structure is more spreading and somewhat finer than Norwegian Sunset. Introduced in 1989.

Advantages: Has brighter fall colors and finer branching than Norway maple. The parentage suggests the mature size will be smaller than Norway maple and more heat tolerant.

Limitations: None known yet. Mature size is uncertain. Refer to *Acer platanoides* for possible problems.

Site and Culture: Transplants readily. Tolerates partial shade and a wide range of soils, pH, heat, drought, and pollutants.

Notes:



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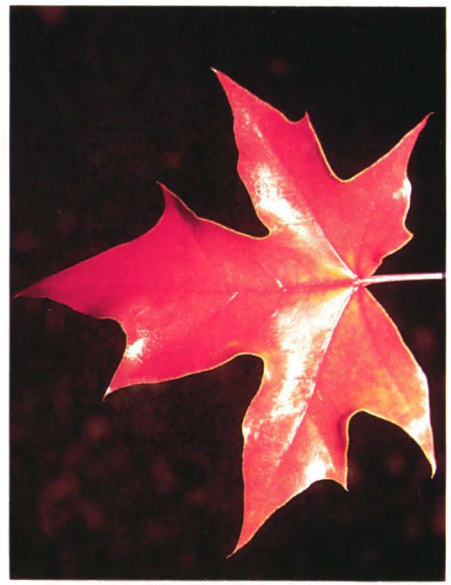
Pacific Sunset Shantung Hybrid Maple

Henry D. Gerhold, Penn State University

Keith Warren,
J. Frank Schmidt & Son



Keith Warren,
J. Frank Schmidt & Son

Baumann Horsechestnut

Ae hp Bm

Aesculus hippocastanum 'Baumannii'

Height:	60′ to 70′ (40′ at age 30)
Width:	45″ to 55′ (35′ at age 30)
Hardiness Zone:	4 to 8
Crown:	ovate, upright, medium-coarse texture
Foliage:	palmately compound with 4″ to 10″ leaflets, typically scorched in late summer, yellow in fall
Flowers:	white, 9″ double flowers in tight clusters, showy and long lasting in spring
Fruit:	fruitless
Description:	Known since 1822, it was discovered in Switzerland as a branch sport of the common horsechestnut. The species is native to Greece and Albania, and is widely planted in Europe as a specimen tree in parks and spacious public places. Growth rate is slow.
Advantages:	Long-lasting, showy flowers, and tolerant of urban conditions.
Limitations:	Nearly always has leaf scorch in late summer under stressful conditions. Susceptible also to leaf blotch, powdery mildew, anthracnose, cankers, leaf spot, mealy bug, Japanese beetle, scale insects, and Tussock moth. Availability may be a problem.
Site and Culture:	Transplant B&B into moist, well drained soil. Adaptable to a range of pH, prefers full sun.
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Baumann Horsechestnut

Edward R. Hasselkus, University of Wisconsin

Robert Skiera, Milwaukee City Forester

William Hendricks, Klyn Nurseries

Ruby Red Horsechestnut

Ae xc Br

Aesculus x *carnea 'Briotii'*

Height: 35′ to 50′ (35′ at age 30)
Width: 30′ to 45′ (30′ at age 30)
Hardiness Zone: 5 to 7

Crown: broadly ovate, compact, medium-coarse texture
Foliage: lustrous dark green, palmately compound, smaller than horsechestnut leaves, no notable fall color
Flowers: bright red 6″ to 10″ spikes, a deeper color and larger than flowers of seedlings
Fruit: nearly fruitless

Description: Originated long ago in France or Germany from a cross of *A. pavia* **x** *A. hippocastanum.* It is widely planted in Europe in parks and along avenues. Growth rate is slow.

Advantages: Valued especially for its beautiful flowers, it resists heat and drought better than other horsechestnuts and requires little pruning. Where space for roots is limited, its stature remains smaller without much loss of vigor. It tolerates urban conditions.

Limitations: Some leaf and flower litter occurs during the summer and fall. Its shade is very dense. Little information exists on diseases or insects. Though *'Briotii'* is less susceptible to leaf scorch or blotch than *A. hippocastanum,* it may scorch severely. Sunscald causes bark to crack. Availability may be a problem, especially in larger sizes.

Site and Culture: Transplant B&B into moist, well drained soil. Recovers slowly from transplanting. Prefers full sun and acid to neutral pH.

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Ruby Red Horsechestnut

Henry D. Gerhold, Penn State University

William H. Collins, Plant Materials Consultant

Serviceberry Species and Hybrids

Am lv

Amelanchier arborea, A. canadensis, A. laevis, and A. x *grandiflora* Tree Form

---

Height: 15′ to 30′ (20′ at age 30)
Width: 15′ to 25′ (15′ at age 30)
Hardiness Zone: 3 to 8

Crown: irregularly ovate or globose, medium fine texture
Foliage: 1″ to 3″, delicate, purplish green when young, then green; turns yellow, orange, and dull red in fall
Flowers: white, pendulous clusters in early spring, before leaves emerge
Fruit: red to purple in summer, attractive to birds.

Description: There are closely related species of *Amelanchier,* some of which hybridize in nature. *A. arborea, A. canadensis, A. laevis,* or *A. x grandiflora* may appear in nursery catalogs. These are small trees or large shrubs with medium growth rate. Must be trained in the nursery to street tree form. Ornamental gray bark is streaked with long fissures. Native to upland moist sites in eastern and midwestern North America.

Advantages: These small trees with attractive bark, flowers, fruit, and small leaves are quite versatile. They are shade tolerant, but thrive also in full sun.

Limitations: Somewhat sensitive to drought, soil compaction, salt, and air pollutants. May be infested by leaf diseases, fireblight, leaf insects, lacebug, pear slug sawfly, or borers.

Site and Culture: Prefers well drained, moist, acid soils of medium texture. Trees above 1½ inches should be transplanted B&B. Recovers slowly after transplanting. Requires little pruning after lower branches have been removed for clearance. Can be grown in containers in the shade.

Cultivars: For street tree use, cultivars selected for upright, straighter trunks are preferable to seedling plants. Crown size varies from very narrow to quite broad.

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Serviceberry Species and Hybrids

Ohio State University

Ohio State University

Ohio State University

Cumulus Serviceberry

Am lv Cu

Amelanchier laevis **'Cumulus'** Tree Form
P.P. 3092

Height:	25′ to 30′ (25′ at age 30)
Width:	12′ to 18′ (15′ at age 30)
Hardiness Zone:	4 to 8
Crown:	moderately columnar, medium fine texture
Foliage:	similar to species, turns bright yellowish-orange to scarlet in fall
Flowers:	covered with white blossoms in early spring
Fruit:	fruit turns red, then purple in June, is readily consumed by birds
Description:	A vigorous, upright hybrid selected in New Jersey and introduced in 1972.
Advantages:	The desirable growth habit, flowering and fruit, and limited size add to the versatility of this tree.
Limitations:	May sucker at the root collar. Otherwise it is the same as other serviceberry cultivars. Somewhat sensitive to drought, soil compaction, salt, and air pollutants. May be infested by leaf diseases, fireblight, leaf insects, pear slug sawfly, or borers.
Site and Culture:	Species information applies. It prefers well drained, moist, acid soils of medium texture. Trees above 1½ inches should be transplanted B&B. Recovers slowly after transplanting. Requires little pruning after lower branches have been removed for clearance. Can be grown in containers in the shade.
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Cumulus Serviceberry

Edward R. Hasselkus, University of Wisconsin

William Flemer III, Princeton Nurseries

Majestic Serviceberry

Am lv Ma

Amelanchier laevis **'Majestic'** Tree Form
P.P. 7203

Height: 20′ to 30′ (25′ at age 30)
Width: 15′ to 20′ (15′ at age 30)
Hardiness Zone: 4 to 8

Crown: ovate, irregular, medium-fine texture
Foliage: bronze at emergence turning dark green, coppery-orange to red in the fall
Flowers: large clusters of white flowers
Fruit: purplish-black berries are showy and edible

Description: A graceful, airy tree that grows vigorously. It is also grown in clump form. Originated in New Jersey and was introduced in 1992.

Advantages: Attractive features in all seasons. Foliage remains clean and is disease resistant. Suitable for many sites where space is limited

Limitations: May be difficult to find in tree form. Presumably similar to other serviceberries, as this cultivar was introduced only recently. Somewhat sensitive to drought, soil compaction, salt, and air pollutants. May be infested by fireblight, leaf insects, pear slug sawfly, or borers.

Site and Culture: Species information applies. Prefers well drained, moist, acid soils of medium texture. Trees above 1½″ caliper should be transplanted B&B. Recovers slowly after transplanting. Requires little pruning after lower branches have been removed for clearance. Can be grown in containers in light shade.

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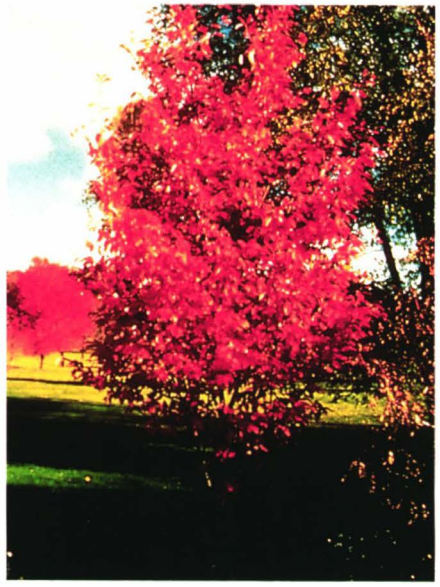
Majestic Serviceberry

William Flemer III, Princeton Nurseries



Donald R. Selinger, Bailey Nurseries

William Flemer III, Princeton Nurseries

Autumn Brilliance Serviceberry

Am xg AB

Amelanchier x *grandiflora* **'Autumn Brilliance'** Tree Form
P.P. 5717

Height: 20′ to 25′ (20′ at age 30)
Width: 15′ to 18′ (15′ at age 30)
Hardiness Zone: 4 to 8

Crown: ovate, medium fine texture
Foliage: dark green lustrous leaves, turn brilliant orange to red in fall and persist well
Flowers: reliable, abundant white blossoms
Fruit: abundant fruit is soon consumed by birds.

Description: Originated in Illinois and was introduced in 1986. Grows vigorously and develops a moderately spreading branch pattern.

Advantages: Good growth habit, reliable bloom, and limited size make this tree suitable for many sites where space is limited. Resistant to leaf spot and subsequent defoliation, and somewhat to fireblight.

Limitations: Presumably the same as other serviceberries, as this cultivar was introduced just recently. Somewhat sensitive to drought, soil compaction, salt, and air pollutants. May be infested by leaf diseases, leaf insects, pear slug sawfly, or borers.

Site and Culture: Species information applies. It prefers well drained, moist, acid soils of medium texture. Trees above 1½ inches should be transplanted B&B. Recovers slowly after transplanting. Requires little pruning after lower branches have been removed for clearance. Can be grown in containers in the shade.

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Autumn Brilliance Serviceberry

Henry D. Gerhold, Penn State University

Willet N. Wandell, Discov-Tree Research

Henry D. Gerhold, Penn State University

Princess Diana Serviceberry

Am xg PD

Amelanchier x grandiflora **'Princess Diana'** Tree Form
P.P. 6041

Height:	20′ to 30′ (20′ at age 30)
Width:	15′ to 20′ (15′ at age 30)
Hardiness Zone:	4 to 8
Crown:	broadly ovate, irregular, medium-fine texture
Foliage:	green, turning bright red in the fall
Flowers:	white, in clusters
Fruit:	red to purple berries are showy and edible, readily consumed by birds

Description: A gracefully spreading tree that is usually grown in clump form, but can be trained to a single stem. Originated in Wisconsin and was introduced in 1987. Growth rate is moderate.

Advantages: Attractive features in all seasons. It is claimed that foliage remains clean and is disease resistant. Suitable for many sites where space is limited.

Limitations: May be difficult to find in tree form. Presumably similar to other serviceberries, as this cultivar was introduced only recently. Somewhat sensitive to drought, soil compaction, salt, and air pollutants. Susceptibility to fireblight, leaf insects, pear slug sawfly, or borers is unknown.

Site and Culture: Species information applies. Prefers well drained, moist, acid soils of medium texture. Trees above 1½″ caliper should be transplanted B&B. Recovers slowly after transplanting. Requires little pruning after lower branches have been removed for clearance. Can be grown in containers in light shade.

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Princess Diana Serviceberry

Henry D. Gerhold, Penn State University

Henry D. Gerhold, Penn State University

Keith Warren, J. Frank Schmidt & Son

Robin Hill Serviceberry

Am xg RH

Amelanchier x *grandiflora* **'Robin Hill'** Tree Form

Height:	20′ to 25′ (20′ at age 30)
Width:	12′ to 15′ (13′ at age 30)
Hardiness Zone:	4 to 8
Crown:	ovate, spreading with age, medium fine texture
Foliage:	bronze-tinged green leaves, turning yellow to red in fall
Flowers:	masses of faintly pink flowers in April which quickly fade to white
Fruit:	small, red to purple fruits are attractive to birds
Description:	A good tree form of serviceberry, it is upright, has dense foliage, and attractive flowers and fruit. Selected from a native tree in Pennsylvania.
Advantages:	A versatile landscape tree whose upright habit and limited size makes it suitable for narrow tree lawns and under utility lines.
Limitations:	Species limitations for serviceberries apply. Somewhat sensitive to drought, soil compaction, salt, and air pollutants. May be infested by leaf diseases, fireblight, leaf insects, pear slug sawfly, or borers.
Site and Culture:	Species information applies. It prefers well drained, moist, acid soils of medium texture. Trees above 1½ inches should be transplanted B&B. Recovers slowly after transplanting. Requires little pruning after lower branches have been removed for clearance. Can be grown in containers in the shade.
Notes:	

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Robin Hill Serviceberry

Henry D. Gerhold, Penn State University

Henry D. Gerhold, Penn State University

Henry D. Gerhold, Penn State University

Tradition Serviceberry

Am xg Tr

Amelanchier x grandiflora **'Trazam'** Tree Form
trademarked

Height:	25′ to 30′ (25′ at age 30)
Width:	15′ to 20′ (15′ at age 30)
Hardiness Zone:	4 to 8
Crown:	ovate upright, medium-fine texture
Foliage:	grayish-green, turning orange and red in the fall
Flowers:	white, in clusters
Fruit:	red to blue-black berries are edible, readily consumed by birds

Description: A small tree with a strong central leader and a good branching habit. Originated in Ohio and was introduced in 1988.

Advantages: Attractive features in all seasons. Suitable for planting in the landscape or in urban sites where space is limited.

Limitations: May be difficult to find in tree form. Presumably similar to other serviceberries, as this cultivar was introduced only recently. Somewhat sensitive to drought, soil compaction, salt, and air pollutants. May be infested by fireblight, leaf insects, pear slug sawfly, or borers. Thorny rootsuckers may grow from *Crataegus* understock.

Site and Culture: Species information applies. Prefers well drained, moist, acid soils of medium texture. Trees above 1½″ should be transplanted B&B. Recovers slowly after transplanting. Requires little pruning after lower branches have been removed for clearance, but rootsuckers may need to be removed periodically. Can be grown in containers in light shade.

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Tradition Serviceberry

Henry D. Gerhold, Penn State University

Henry D. Gerhold, Penn State University

James W. Zampini, Lake County Nursery

Heritage River Birch

Be ni Hr

Betula nigra **'Heritage'** Tree Form
P.P. 4409, trademarked

Height:	40′ to 50′ (45′ at age 30)
Width:	30′ to 35′ (30′ at age 30)
Hardiness Zone:	4 to 9
Crown:	conical to ovate, medium texture
Foliage:	2″, glossy dark green, briefly yellow in fall
Flowers:	2″ to 3″ catkins
Fruit:	small nutlet

Description: The species typically is found along streambanks in eastern and midwestern U.S. 'Heritage' was introduced in 1979. It grows rapidly when established and the crown form is consistent, unlike the somewhat irregular growth habit of the species. Its salmon-white, peeling bark is lighter and remains smooth longer than the species.

Advantages: Improved bark color and vigor. Like the species, it has better resistance to bronze birch borer than white-barked birches.

Limitations: Susceptible to leaf miner, moisture stress, and to leaf spots in wet climates. Iron chlorosis can occur when pH is too high. Does not have a long service life as a street tree.

Site and Culture: Transplants well. Prefers moist, well drained acid soils.

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Heritage River Birch

Henry D. Gerhold, Penn State University

Henry D. Gerhold,
Penn State University

Henry D. Gerhold,
Penn State University

Whitespire Japanese White Birch

Be pj Wh

Betula platyphylla var. *japonica* Tree Form
'Whitespire Jr.' or **'Whitespire Sr.'**

Height: 40′ to 50′ (40′ at age 30)
Width: 15′ to 25′ (20′ at age 30)
Hardiness Zone: 3 to 8

Crown: conical, compact, medium-fine texture
Foliage: 1½″ to 3″, glossy dark green, yellow in fall
Flowers: catkins
Fruit: small nutlets

Description: Originated from the southernmost part of its natural range in Japan. 'Whitespire Jr.' is propagated by seed, whereas 'Whitespire Sr.' is propagated vegetatively from trees selected in Wisconsin. 'Whitespire Jr.' was introduced in 1977 as "University of Wisconsin Strain". The appearance is similar to European white birch. But the white bark with black markings is grayer, and does not exfoliate.

Advantages: Heat tolerance has been claimed to confer resistance to bronze birch borer, a serious pest; however, trees in Ohio were susceptible. Resistance to leafhopper is also claimed.

Limitations: Little information is available; presumably it is similar to other birches. A short service life as a street tree may be anticipated. Availability is limited.

Site and Culture: In general, it is similar to other birches. 'Whitespire Sr.' is more uniform and predictable than the trees propagated from seed, and may be preferable for this reason.

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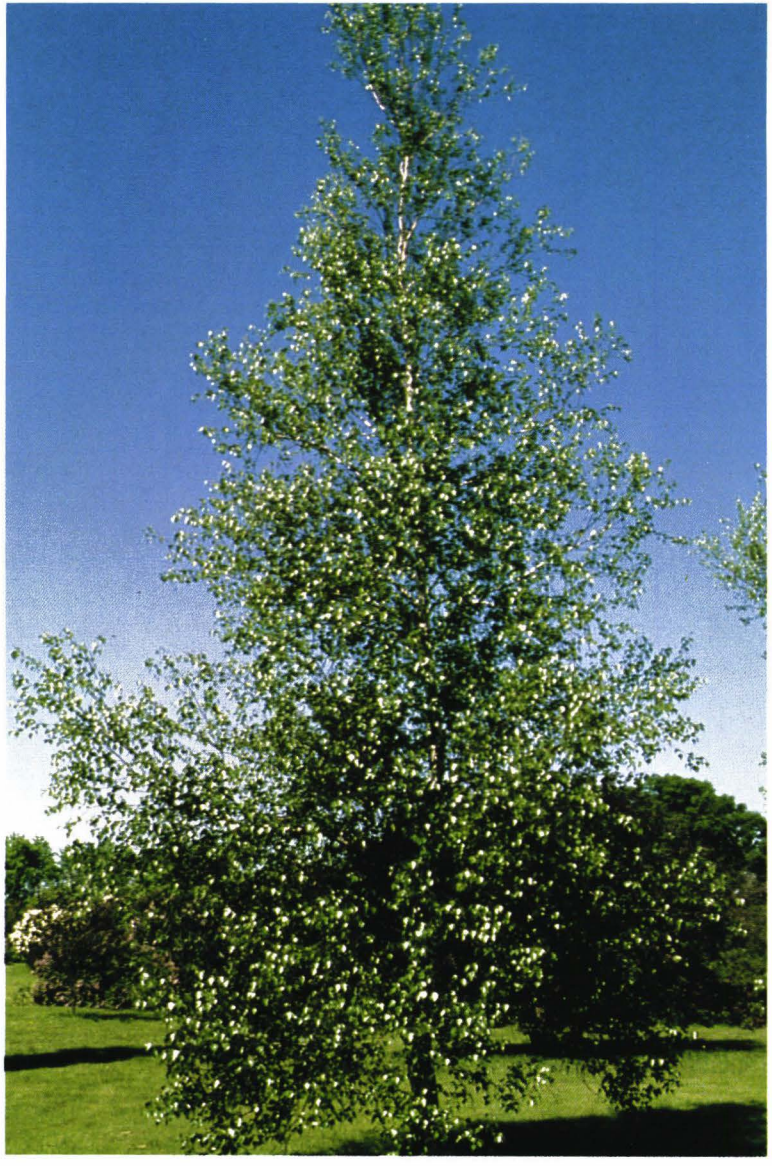
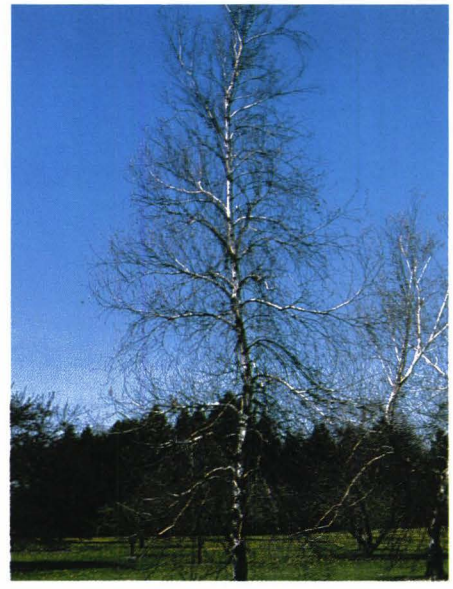
Whitespire Japanese White Birch



Donald R. Selinger, Bailey Nurseries



Donald R. Selinger,
Bailey Nurseries

Henry D. Gerhold,
Penn State University

Fastigiate European Hornbeam

Ca be Fa

Carpinus betulus **'Fastigiata'** Tree Form

Height: 35′ to 40′ (35′ at age 30)
Width: 20′ to 30′ (25′ at age 30)
Hardiness Zone: 5 to 8

Crown: narrowly conical, becoming broadly ovate, dense, medium-fine texture
Foliage: 2½″ to 3″, yellow-green to yellow in fall
Flowers: catkins with bracts
Fruit: leafy cluster with nutlets

Description: A European tree most commonly used for hedges and screening, but also for other landscape purposes including street trees. Sinewy gray bark and corrugated leaves impart a distinctive texture. Slow to medium growth rate. Narrow in youth, the tree becomes broad when mature.

Advantages: Suitable for a wide range of site conditions, including light shade. Relatively maintenance free. Withstands heavy pruning. Suitable for containers, screening, and other uses.

Limitations: Occasionally suffers from dieback, leaf spot, or bark cankers. Usually no serious diseases or insects, but sometimes dieback or the two-lined chestnut borer will shorten the service life.

Site and Culture: Transplant B&B in the spring. Grows well in full sun or partial shade. Soil may be light to heavy, acid to alkaline. Tolerates urban conditions, including pollution. Prune lower branches for clearance while still small. Stress will limit service life.

Cultivars: Selected for upward branching and compact crown form, *'Fastigiata'* is preferable for most street situations. Cultivars *'Columnaris'* and *'Pyramidalis'*, also selected for upward branching and compact crown form, are commonly confused in the nursery trade.

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Fastigate European Hornbeam

William Hendricks, Klyn Nurseries

Ohio State University

Ohio State University

American Hornbeam

Ca ca

Carpinus caroliniana Tree Form

Height:	20′ to 35′ (20′ at age 30)
Width:	20′ to 35′ (20′ at age 30)
Hardiness Zone:	3 to 9
Crown:	ovate or broadly columnar, irregular, medium-fine texture
Foliage:	2″ to 4″ green to bluish green leaves; yellow, orange, and dark red in fall
Flowers:	catkins with bracts, white if female, yellow-green if male
Fruit:	nutlets in a leafy cluster

Description: A small single- or multi-stemmed tree widely distributed in eastern North America along streams and rivers. The trunk is sinewy, often crooked, with bluish gray bark. Its wood is very heavy and hard. Slow growth rate.

Advantages: Well suited for small spaces and shady suburban or rural sites. It can withstand temporary flooding, and is relatively disease-free.

Limitations: Occasional dieback, cankers, leaf spots, or scale insects, none of which has been serious. Sensitive to drought and soil compaction. Dieback or the two-lined chestnut borer sometimes limits service life.

Site and Culture: Somewhat difficult to transplant. Plant B&B trees, only in the spring, in well drained, somewhat acid to neutral soils. Sterilize pruning tools to overcome its tendency to canker. Southern seed sources are not hardy in the north.

Cultivars: No cultivars are commonly available.

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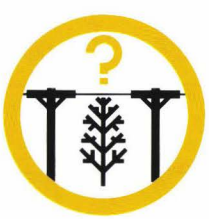

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American Hornbeam

Henry D. Gerhold, Penn State University

Henry D. Gerhold,
Penn State University

Henry D. Gerhold,
Penn State University

All Seasons Sugar Hackberry

Ce Iv AS

Celtis laevigata **'All Seasons'**
P.P. 4989

Height:	40′ to 50′ (40′ at age 30)
Width:	30′ to 40′ (30′ at age 30)
Hardiness Zone:	6 to 9
Crown:	broadly globose, well balanced, medium texture
Foliage:	1½″ to 3″, lustrous green, turning lemon yellow in fall
Flowers:	inconspicuous clusters
Fruit:	small red drupes

Description: The species is native on a variety of sites in southeastern, central, and southern states. It is intermediate in shade tolerance and has deep, widespreading roots. Growth rate is moderate. 'All Seasons' originated in Illinois and was introduced in 1983. It has a full crown, ascending branches, thicker twigs that shed less, and light gray bark that is generally smooth with a few corky ridges.

Advantages: Improved crown, leaves, and branching habit. The species is tolerant of city conditions and does not get witches brooms or nipple gall, which occur on common hackberry.

Limitations: Becomes chlorotic on alkaline soils. Availability may be a problem.

Site and Culture: Transplant only in the spring: recovers slowly. Tolerates full sun or light shade, wet to dry sites, compaction, salt, and pollution.

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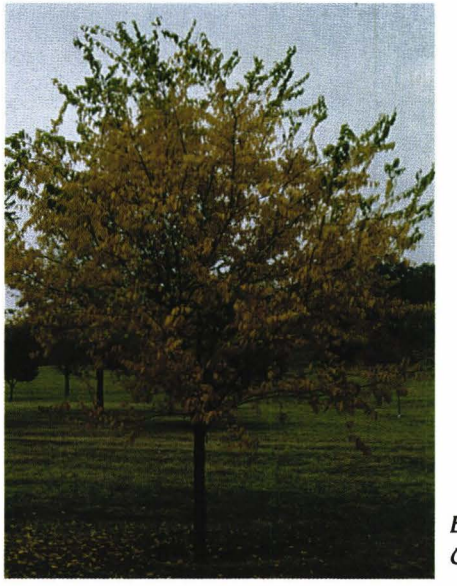
All Seasons Sugar Hackberry

Henry D. Gerhold, Penn State University



Edward R. Hasselkus,
University of Wisconsin

Henry D. Gerhold, Penn State University

Prairie Pride Hackberry

Ce oc PP

Celtis occidentalis **'Prairie Pride'**
P.P. 3771, trademarked

Height:	40′ to 50′ (40′ at age 30)
Width:	40′ to 50′ (40′ at age 30)
Hardiness Zone:	4 to 9
Crown:	broadly globose and compact, ascending branches, medium texture
Foliage:	lustrous, deep green, leathery leaves; yellow in fall
Flowers:	inconspicuous clusters
Fruit:	small dark red to purple drupes, crops smaller than usual for the species

Description: The species is native on a variety of sites in central and eastern U.S. It is intermediate in shade tolerance and has deep, widespreading roots. 'Prairie Pride' originated in Illinois and was introduced in 1975. It is a compact, rugged tree with a strong central leader that grows rapidly and develops numerous branches with a good structure. The gray bark develops attractive corky warts.

Advantages: Improved leaves and growth habit. The species tolerates urban conditions, including drought and alkaline soils.

Limitations: The species is susceptible to nipple gall on leaves, powdery mildew, leaf spots, scale insects, and defoliation by mourning cloak butterfly caterpillars. Availability may be a problem

Site and Culture: Transplant in spring; recovers slowly. Tolerates light shade, wet to dry sites, acid to alkaline soils, compaction, salt, and pollution.

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Prairie Pride Hackberry

Willet N. Wandell, Discov-Tree Research

Edward R. Hasselkus,
University of Wisconsin

Willet N. Wandell, Discov-Tree Research

Magnifica Hackberry

Ce xx Ma

Celtis laevigata x occidentalis **'Magnifica'**
P.P. 2795

Height:	50′ to 60′ (40′ at age 30)
Width:	50′ to 60′ (40′ at age 30)
Hardiness Zone:	5 to 8
Crown:	broadly globose, medium texture
Foliage:	lustrous green, turning yellow in fall
Flowers:	inconspicuous clusters
Fruit:	nearly sterile

Description: 'Magnifica' was selected for rapid growth, good form, and resistance to leafhopper in a New Jersey nursery. It was patented in 1968 and introduced soon afterwards. Trees grown from the same seedlot, possibly from a Missouri origin, exhibited characteristics intermediate between *C. laevigata* and *C. occidentalis*; so they were believed to be natural hybrids.

Advantages: Tolerates city conditions. Does not develop witches broom or nipple gall, and is resistant to leafhoppers.

Limitations: Probably similar to limitations of All Seasons and Prairie Pride, but not well known. May be difficult to find in some regions.

Site and Culture: Transplant in spring; recovers slowly. Tolerates full sun or light shade, wet to dry sites, salt, and soil compaction.

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Magnifica Hackberry

William Flemer III, Princeton Nurseries

Katsura Tree

Cd ja

Cercidiphyllum japonicum Tree Form

Height:	40′ to 60′ (50′ at age 30)
Width:	25′ to 60′ (40′ at age 30)
Hardiness Zone:	5 to 8
Crown:	conical, some trees becoming globose with age, medium-fine texture
Foliage:	2″ to 4″, heart-shaped leaves, purplish at emergence becoming bluish-green, yellow to apricot-orange in the fall
Flowers:	dioecious, not showy
Fruit:	small pods
Description:	A handsome tree of variable form with attractive foliage, native to China and Japan. Growth rate is medium to fast after establishment. Slightly shaggy bark of older trees and reddish-brown twigs add interest in winter.
Advantages:	Seldom suffers from diseases or insects. Subtly attractive in all seasons.
Limitations:	Suffers from drought and compacted soils. Trunk sunburns easily when young. May be difficult to find in some regions.
Site and Culture:	Somewhat difficult to transplant; recovers slowly. Plant in spring as B&B or container-grown tree. Prefers full sun and rich, moist soil. Water during droughts until well established.
Cultivars:	Weeping forms have been selected, but none for street tree traits; they are not easy to find.
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Katsura Tree

Henry D. Gerhold, Penn State University

Henry D. Gerhold,
Penn State University

Henry D. Gerhold,
Penn State University

Eastern Redbud

Cc ca

Cercis canadensis Tree Form

Height:	25′ to 30′ (20′ at age 30)
Width:	25′ to 35′ (20′ at age 30)
Hardiness Zone:	4 to 9
Crown:	broadly ovate, becoming flat-topped, medium texture
Foliage:	heart-shaped leaves reddish at emergence, becoming dark green, and yellow in the fall
Flowers:	reddish purple buds open to rosy pink before leaves appear
Fruit:	2″ to 3″ pods, often abundant
Description:	A picturesque small tree with ascending graceful branches and abundant bright flowers in early spring. It commonly has multiple trunks, unless pruned to a single stem.
Advantages:	Can be used as a street tree in broad tree lawns in residential areas, though it is more effective in naturalized woodland settings.
Limitations:	Canker can be destructive; also subject to *Verticillium* wilt, leaf spots, caterpillars, leafhoppers, and scales. Only plants from northern seed sources are hardy in zones 4 and 5.
Site and Culture:	Transplant B&B, or bare root with extra care. Maintain vigor by watering when needed and occasional fertilizing. Adaptable to full sun or light shade, acid or alkaline well drained soils. Requires little pruning after lower branches have been removed for clearance.
Cultivars:	Several named varieties have been selected for ornamental traits; 'Forest Pansy', which has purple foliage and is hardy to Zone 6, can be grown in tree form. Definitely avoid seed sources and nurseries south of the planting site, for their trees are apt to be less winter hardy. Wisconsin and Minnesota strains are the most winter hardy. Western strains are more tolerant of drought.
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Eastern Redbud

Henry D. Gerhold, Penn State University

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Henry D. Gerhold, Penn State University

Yellowwood

Cl kn

Cladrastis kentukea (lutea)

Height: 35′ to 50′ (40′ at age 30)
Width: 40′ to 55′ (45′ at age 30)
Hardiness Zone: 4 to 8

Crown: broadly ovate to globose, low spreading branches, medium texture
Foliage: 8″ to 12″ compound leaves, bright green, golden yellow in fall
Flowers: creamy white, pendulous, fragrant panicles in May-June
Fruit: 3″ brown pods

Description: Occurs as a scattered tree on mesic sites in Kentucky and surrounding states. The smooth gray trunk divides a few feet above the ground into several ascending branches with acute crotches. Growth rate is medium.

Advantages: Seldom has serious disease or insect problems. Attractive foliage, flowers, and bark.

Limitations: Major limbs sometimes split at the crotch. Thin bark is subject to mechanical damage. Sensitive to drought, compaction, canker, and *Verticillium* wilt.

Site and Culture: Obtain trees from a nursery no farther south than the planting site, to avoid trees subject to winter injury. Transplant B&B. Prefers full sun, well drained soil, acid or alkaline. Careful pruning is needed while trees are young to develop the desired trunk form and branching structure. Prune only in summer, to avoid profuse bleeding in winter or spring.

Cultivars: 'Rosea', a variety with pink flowers, was found in Massachusetts, but is not commonly available.

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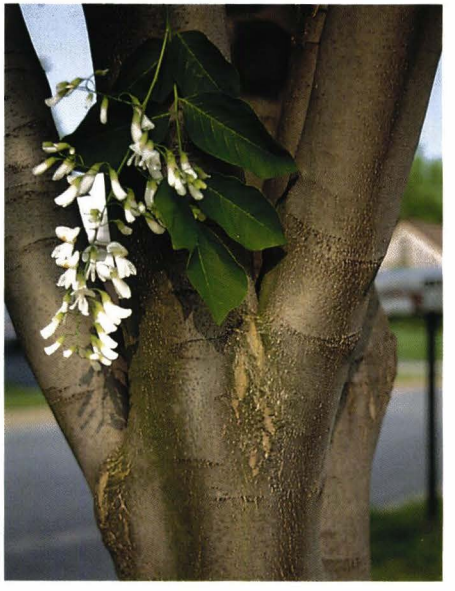
Yellowwood

Henry D. Gerhold, Penn State University

Henry D. Gerhold,
Penn State University



Henry D. Gerhold,
Penn State University

Kousa Dogwood

Cn ku

Cornus kousa Tree Form

Height:	20′ to 30′ (20′ at age 30)
Width:	20′ to 30′ (20′ at age 30)
Hardiness Zone:	5 to 8
Crown:	vase-shaped in youth, later broadly ovate with layered branches, medium texture
Foliage:	2″ to 4″ dark green leaves, reddish purple to scarlet in fall
Flowers:	flowers with four creamy-white, pointed bracts persist several weeks in early summer
Fruit:	pink to red raspberry-like drupe, eaten by birds

Description: Besides the beautiful flowers and foliage, the exfoliating bark develops a rich mottling of brown, gray, and tan on older trees. Though typically low-branched, a tree form suitable for streets can be trained if pruning starts early. Growth rate is slow to medium. The species is native to China, Korea, and Japan.

Advantages: Much more resistant to anthracnose, borers, and drought than *Cornus florida.* Attractive features prevail in all seasons.

Limitations: Difficult to find plants grown in tree form. Seldom has serious disease or insect problems. Leaf scorch may occur under drought conditions. Fruits can cause a litter problem.

Site and Culture: Transplant B&B into a sunny site. Prefers rich, acid, well drained soil. Some pruning is needed while trees are young to develop the desired trunk form of street trees.

Cultivars: Many cultivars have been selected, most for flowering and growth habits. 'Milky Way' is one of the most popular. Several recently released hybrids between *C. florida* and *C. kousa* (cultivar names prefixed Rut---) have the pest resistance of *C. kousa,* exhibit hybrid vigor, and are otherwise intermediate.

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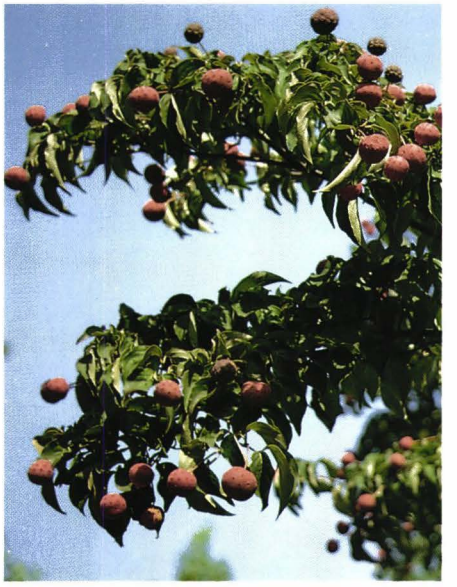
Kousa Dogwood

Henry D. Gerhold, Penn State University



Henry D. Gerhold,
Penn State University

Henry D. Gerhold,
Penn State University

Turkish Hazel or Turkish Filbert

Co co

Corylus colurna Tree Form

Height:	45′ to 60′ (40′ at age 30)
Width:	25′ to 35′ (25′ at age 30)
Hardiness Zone:	5 to 7
Crown:	conical, symmetrical, medium texture
Foliage:	3″ to 5″, dense, deep green, a lackluster yellow to purple in fall
Flowers:	catkins in spring
Fruit:	½″ nuts in fringed husk, gathered by squirrels and bluejays
Description:	A stately tree from southeastern Europe and western Asia, it is very symmetrical and has light brown corky to scaly bark. Trees grown from seed are fairly uniform and have a medium growth rate.
Advantages:	Useful for formal avenues or as a specimen tree. Withstands a range of adverse conditions. Leaves remain dark green even in droughts and resist scorching. Little maintenance required after tree becomes established. No serious diseases or insects.
Limitations:	Leaves not particularly attractive in fall. Nuts may be a litter problem. Susceptible to Japanese beetles.
Site and Culture:	Full sun preferred. Somewhat difficult to transplant. May need to be watered the first year or two, then tolerates drought, a wide range of pH, and other adverse conditions.
Cultivars:	No cultivars are in production, and even seedling trees may be hard to find.
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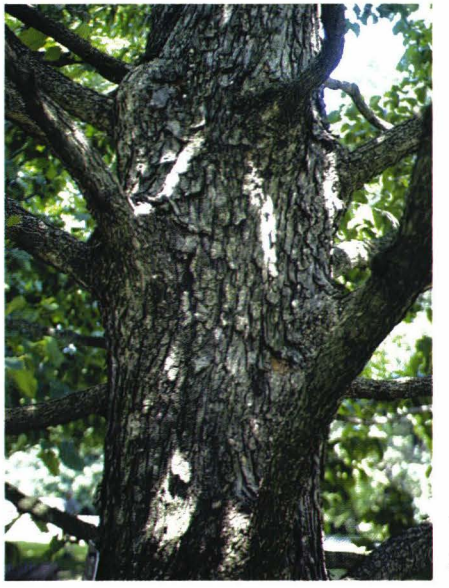
Turkish Hazel or Turkish Filbert

Henry D. Gerhold, Penn State University



William Hendricks, Klyn Nurseries

William Hendricks, Klyn Nurseries

Hawthorn

Cr

Crataegus (many species)

Height: 15′ to 35′ (20′ at age 30)
Width: 10′ to 35′ (20′ at age 30)
Hardiness Zone: 4 to 8

Crown: broadly ovate to globose, low branching, thorny, medium fine texture
Foliage: 1″ to 4″, yellow, orange, red, or purple in fall
Flowers: white or pink, some are malodorous
Fruit: red pome, ¼″ to 1″, more or less persistent

Description: More than 1,100 "species" of *Crataegus* native to North America have been named, and many others occur in Europe, Asia, and Africa. This unstable genus is highly variable within and among species, many of which hybridize in nature. Characteristics include a small size, spreading thorny branches, susceptibility to many diseases, and tolerance to a wide range of sites and adverse conditions.

Advantages: These are the toughest of the small flowering trees, and relatively long-lived under urban conditions. See cultivar factsheets for details.

Limitations: For details on diseases and thorniness, see cultivar factsheets.

Site and Culture: Order tree-form plants for street trees. Transplant in spring, to site in full sun. Soil can be acid or alkaline, droughty to wet, light to heavy. Prune for clearance while plants are small. Staking is needed when plants are small and in exposed locations.

Cultivars: The most important traits for choosing street tree cultivars are appropriate form and branching habit, resistance to diseases, and absence of long dangerous thorns.

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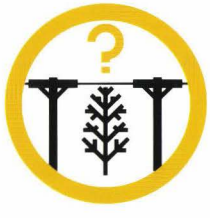

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Hawthorn

Ohio State University

Ohio State University

Ohio State University

Thornless Cockspur Hawthorn

Cr cr in

Crataegus crus-galli var. inermis Tree Form

Height: 15′ to 20′ (15′ at age 30)
Width: 20′ to 25′ (20′ at age 30)
Hardiness Zone: 4 to 8

Crown: globose, dense branches, medium fine texture
Foliage: 1″ to 4″, glossy dark green, orange to purplish-red in fall
Flowers: white, in clusters, unpleasant odor
Fruit: 1/2″, bright red, persistent into late fall, used by wildlife

Description: A thornless selection of the cockspur hawthorn, a native northeastern species which would have many slender thorns if grown from seed. Variety *inermis* has dense, horizontal branches and silvery gray bark. Growth rate is slow to medium.

Advantages: Tolerates urban stresses. Has attractive flowers, fruits, and foliage.

Limitations: May have a few thorns. Unpleasant flower odor lasts about a week in May. Dense branching may make pruning difficult where clearance is needed, and inhibits growth of grass under the tree. Susceptible to cedar apple rust, especially the fruits; also to leaf miner and other diseases and insects.

Site and Culture: Transplant B&B in spring, or bare root with extra care. Plant in full sun and well drained soil. Tolerates wide range of soils, drought, and pollutants. Prune in winter or early spring to develop clearance and a single trunk.

Cultivars: Crusader (trademarked, cv.'Cruzam') is similar to var. *inermis,* and is claimed to be very disease resistant.

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Thornless Cockspur Hawthorn

Henry D. Gerhold, Penn State University

Henry D. Gerhold,
Penn State University

Crimson Cloud English Hawthorn

Cr lv CC

Crataegus laevigata **'Superba'** Tree Form
P.P. 2679

Height: 15′ to 20′ (18′ at age 30)
Width: 12′ to 18′ (14′ at age 30)
Hardiness Zone: 4 to 8

Crown: broadly ovate, medium fine texture
Foliage: dark green and leathery, no fall color
Flowers: large, bright red blossoms with white star in center
Fruit: glossy red fruits persist into winter, not abundant

Description: Selected in New Jersey and introduced in 1966. It was developed from a cross between the old varieties Charles X and Paul's Scarlet, and is also known as 'Superba'. Growth is vigorous and upright.

Advantages: Has attractive flowers, fruit, and growth habit. Grows well under city conditions, and is almost thornless. Resistant to leaf blight, which is so troublesome to Paul's Scarlet.

Limitations: Somewhat susceptible to aphids, lacebug, fireblight, and rust. Size and branching habit must be considered in relation to clearance requirements.

Site and Culture: Genus information applies. Order tree-form plants for street trees. Transplant in spring, to site in full sun. Soil can be acid or alkaline, droughty to wet, light to heavy. Prune for clearance while plants are small. Staking is needed when plants are small and in exposed locations.

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Crimson Cloud English Hawthorn

William Flemer III, Princeton Nurseries

William Hendricks, Klyn Nurseries

William Flemer III, Princeton Nurseries

Washington Hawthorn

Cr ph

Crataegus phaenopyrum Tree Form

Height:	20′ to 30′ (20′ at age 30)
Width:	20′ to 30′ (20′ at age 30)
Hardiness Zone:	4 to 8
Crown:	broadly ovate, dense branches, thorny, medium-fine texture
Foliage:	1″ to 3″ leaves, glossy dark green; orange, red, or purplish-red in fall
Flowers:	white, in clusters
Fruit:	1/4″, bright glossy red, persistent into winter, used by wildlife
Description:	A vegetatively propagated selection of the Washington hawthorn, a native southeastern and midwestern species. Has slender 1″ to 3″ thorns, dense horizontal branches, and silvery gray, scaly bark. Growth rate is slow to medium.
Advantages:	Tolerates severe urban stresses. Has attractive flowers, fruits, and foliage.
Limitations:	Sharp thorns on low branches may be hazardous to pedestrians. Dense branching makes pruning difficult where clearance is needed, and inhibits growth of grass under the tree. Heavy snow may cause splitting and breaking of branches.
Site and Culture:	Transplant B&B in spring, or bare root with extra care. Plant in full sun and well drained soil. Tolerates wide range of soils, drought, and pollutants. Prune in winter or early spring to develop clearance and a single trunk.
Cultivars:	Because this tree is vegetatively propagated in most nurseries, it may be regarded as an unnamed cultivar. Princeton Sentry ('PNI 1661') is almost thornless, has more upright branching, and is relatively pest-free. 'Manbeck Select' has improved tree form.
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Washington Hawthorn

William Flemer III, Princeton Nurseries

Keith Warren,
J. Frank Schmidt & Son

Ralph C. Sievert, Cleveland City Forester

Ohio Pioneer Dotted Hawthorn

Cr pn OP

Crataegus punctata **'Ohio Pioneer'** Tree Form

Height:	20′ to 25′ (23′ at age 30)
Width:	20′ to 25′ (21′ at age 30)
Hardiness Zone:	5 to 8
Crown:	broadly globose, medium-fine texture
Foliage:	grayish green, little fall color
Flowers:	large clusters of white blossoms
Fruit:	dark brick-red, ¾″, ripens and drops in fall
Description:	Selected in Ohio and introduced about 1976. It has good vigor and growth. The branching habit changes from upward to horizontal as the tree ages. Bark is silver-gray.
Advantages:	Grows well on adverse sites. Improved in vigor and reduction in thorns. It is resistant to fireblight.
Limitations:	Size and branching habit must be considered in relation to clearance requirements. Susceptible to cedar-hawthorn rust and mildew. Fruit can cause a litter problem.
Site and Culture:	Genus information applies. Order tree-form plants for street trees. Transplant in spring, to site in full sun. Soil can be acid or alkaline, droughty to wet, light to heavy. Prune for clearance while plants are small. Staking is needed when plants are small and in exposed locations.
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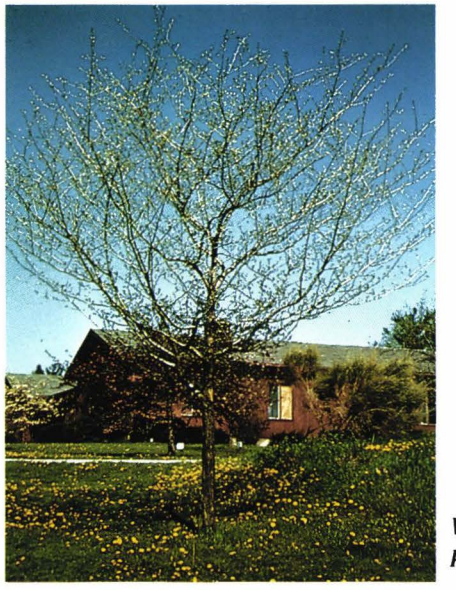
Ohio Pioneer Dotted Hawthorn

Henry D. Gerhold, Penn State University



William H. Collins,
Plant Materials Consultant

Henry D. Gerhold, Penn State University

Winter King Green Hawthorn

Cr vr WK

Crataegus viridis **'Winter King'** Tree Form

Height:	25′ to 30′ (25′ at age 30)
Width:	25′ to 30′ (25′ at age 30)
Hardiness Zone:	4 to 8
Crown:	broadly vase-shaped, medium-fine texture
Foliage:	glossy leaves; turn bronze, red, and gold in fall
Flowers:	white blossoms in 2″ clusters
Fruit:	¼″, orange-red, abundant and persistent through the winter

Description: Selected in Indiana and introduced in 1955. This widespreading tree readily develops a main stem and has ascending branches. The silver-gray bark exfoliates with age.

Advantages: Improved in rust resistance, form, and fruits. It has silver bark color and few thorns. Grows well on adverse sites.

Limitations: Fruits sometimes may be infected by rust when leaves are not. Occasional thorns could be a problem in some situations, and should be considered in relation to clearance requirements. Susceptible to cedar-hawthorn rust. Suckering occurs on *C. phaenopyrum,* the common rootstock.

Site and Culture: Genus information applies. Order tree-form plants for street trees. Transplant in spring, to site in full sun. Soil can be acid or alkaline, droughty to wet, light to heavy. Prune for clearance while plants are small. Staking is needed when plants are small and in exposed locations.

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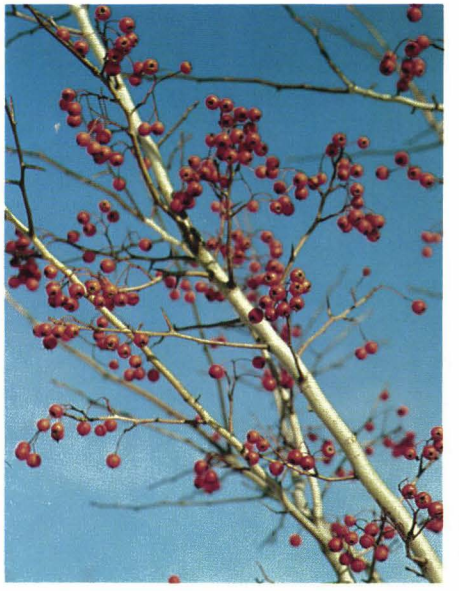
Winter King Green Hawthorn

Henry D. Gerhold, Penn State University



Edward R. Hasselkus,
University of Wisconsin

Keith Warren,
J. Frank Schmidt & Son

Vaughn Hawthorn

Cr xx Vn

Crataegus **'Vaughn'** Tree Form

Height:	20′ to 30′ (25′ at age 30)
Width:	25′ to 35′ (30′ at age 30)
Hardiness Zone:	4 to 8
Crown:	broadly globose, medium-fine texture
Foliage:	dark green, orange to scarlet in fall
Flowers:	white, abundant
Fruit:	masses of glossy, orange-red 3/8″ fruits color early and persist into winter

Description: A cross between *C. crus-galli* and *C. phaenopyrum,* this attractive hybrid has a broad crown and horizontal branch structure. It is easily grown and maintained for urban uses where there is sufficient space.

Advantages: Tolerates a wide range of urban conditions, including soil and aerial salt. Foliage and fruit remain attractive in most years.

Limitations: Vigor is lower in warmer zones. Severe rust on leaves, stems, and fruits has been observed under some conditions. Long sharp thorns can cause injuries. Widespreading, low branching restricts use to more spacious sites.

Site and Culture: Genus information applies. Order tree-form plants for street trees. Transplant in spring, to site in full sun. Soil can be acid or alkaline, droughty to wet, light to heavy. Prune for clearance while plants are small. Staking is needed when plants are small and in exposed locations.

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Vaughn Hawthorn

James W. Zampini, Lake County Nursery

William Hendricks, Klyn Nurseries

Henry D. Gerhold, Penn State University

Hardy Rubber Tree

Eu ul

Eucommia ulmoides

Height:	40′ to 60′ (30′ at age 30)
Width:	40′ to 60′ (30′ at age 30)
Hardiness Zone:	5 to 7
Crown:	conical, becoming globose with age, medium texture
Foliage:	3″ to 6″, glossy green, elm-like leaves, yellowish green in fall
Flowers:	dioecious, not showy
Fruit:	1½″ capsule

Description: A vigorous ornamental tree from China, the only hardy tree that produces latex. The bark on old trees is gray-brown and furrowed, and is valued in China for medicinal properties. Growth rate is slow to medium.

Advantages: No serious disease or insect problems have been reported. Has excellent foliage throughout the growing season.

Limitations: Occasional winter damage and storm damage have occurred, but trees recover quickly. Availability may be limited in some regions.

Site and Culture: Transplants readily, prefers full sun. Tolerant of a broad range of soils, pH, and drought, but not poor drainage or compaction.

Cultivars: None.

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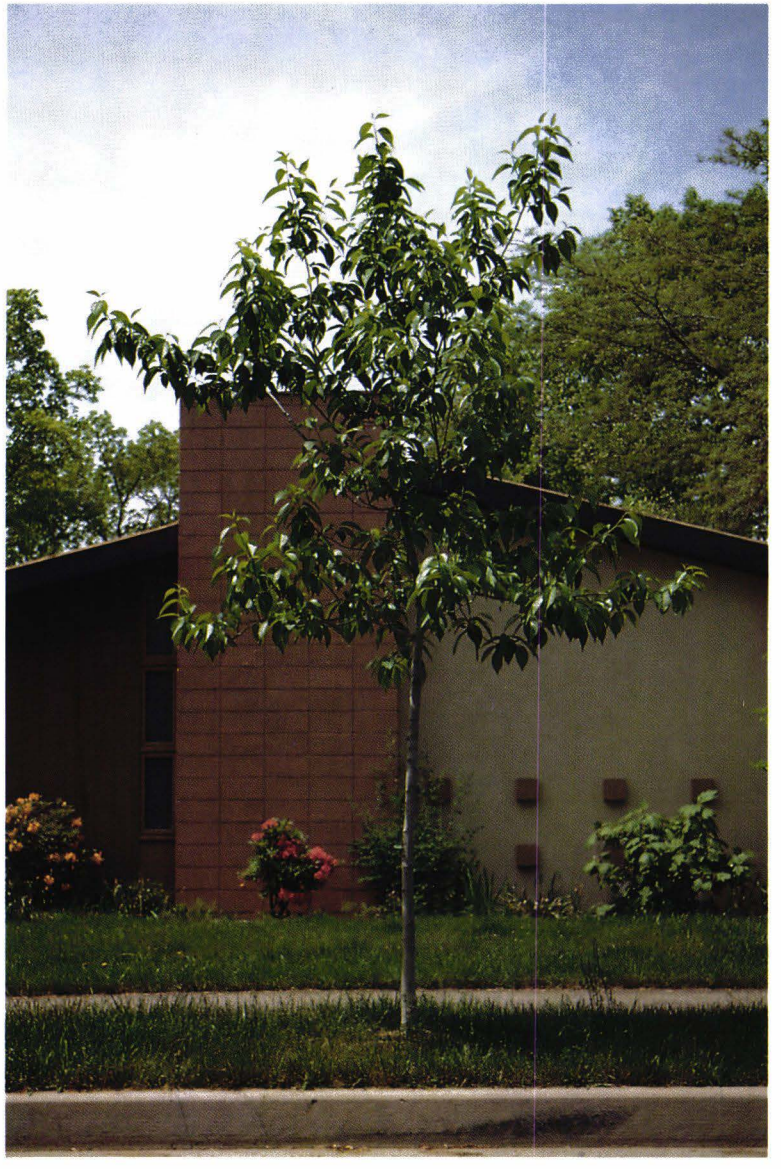
Hardy Rubber Tree



Henry D. Gerhold, Penn State University

Henry D. Gerhold,
Penn State University

James W. Zampini,
Lake County Nursery

White Ash

Fx am

Fraxinus americana

Height: 50′ to 80′ (45′ at age 30)
Width: 40′ to 70′ (40′ at age 30)
Hardiness Zone: 3 to 8

Crown: irregularly ovate, medium texture
Foliage: compound, leaflets 3″ to 5″, yellow to maroon in fall
Flowers: inconspicuous, male and female plants
Fruit: 1″ to 2″ samaras on female trees

Description: Native to moist sites throughout eastern U.S. into Canada. It is intermediate in shade tolerance and has a fast growth rate. Gray bark has small diamond-shaped fissures and narrow ridges.

Advantages: A handsome tree for parks and broad streets. Branching habit is superior to green ash grown from seed. Medium shade is cast which permits grass to grow underneath.

Limitations: Sensitive to drought conditions. Ash decline or dieback, which has complex causes, has become common in some localities. Other diseases usually are not very severe. Susceptible to borers, flower gall on male trees, sawfly, scale insects, bark splitting, leaf rusts, leaf spots, and cankers. Some problems with graft incompatibility have been observed with all cultivars.

Site and Culture: Transplants readily. Soil preferably moist and well drained, somewhat acid to neutral. Tolerates partial shade.

Cultivars: Selections made for superior crown form, branching, and foliage are better than trees grown from seed.

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White Ash

Ohio State University

Ohio State University

Ohio State University

Autumn Applause White Ash

Fx am AA

Fraxinus americana **'Autumn Applause'**
P.P. 3769

Height: 50′ to 60′ (45′ at age 30)
Width: 40′ to 50′ (30′ at age 30)
Hardiness Zone: 5 to 8

Crown: broadly ovate, compact, medium texture
Foliage: deep wine-red color in early fall maintained until frost
Flowers: male
Fruit: seedless

Description: Selected in Illinois and introduced in 1975. It has a compact, symmetrical crown with even branching and a deep red fall color, without the yellow or green that is common in the species.

Advantages: Improved in growth habit, branching, fall color, and seedlessness.

Limitations: Species limitations apply. Sensitive to drought conditions. Ash decline or dieback, which has complex causes, has become common in some localities. Other diseases usually are not very severe. Susceptible to borers, flower gall, sawfly, scale insects, bark splitting, leaf rusts, leaf spots, and cankers. Some problems with graft incompatibility have been observed with all cultivars.

Site and Culture: Species information applies. Transplants readily. Soil preferably moist and well drained, somewhat acid to neutral. Tolerates partial shade.

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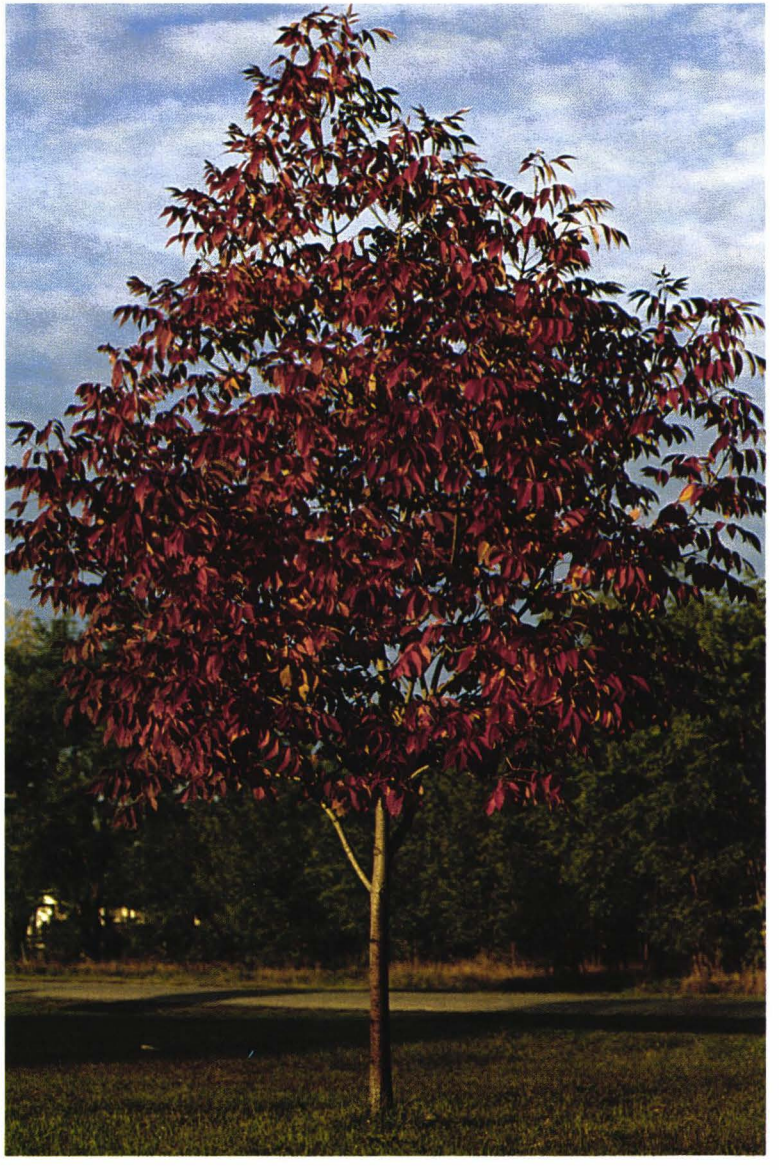
Autumn Applause White Ash



Willet N. Wandell, Discov-Tree Research

Henry D. Gerhold,
Penn State University

Willet N. Wandell, Discov-Tree Research

Autumn Purple White Ash

Fx am AP

Fraxinus americana **'Autumn Purple'**
Trademarked

Height:	50′ to 60′ (45′ at age 30)
Width:	45′ to 55′ (40′ at age 30)
Hardiness Zone:	3 to 8
Crown:	broadly ovate, medium texture
Foliage:	orange-maroon to dark burgundy in fall
Flowers:	inconspicuous, male
Fruit:	seedless

Description: Originated in Madison, Wisconsin and was introduced in 1956. This is the standard white ash in nursery production. It grows rapidly, is straight and sturdy, and is easily trained as a young tree.

Advantages: Improved in vigor, form, and fall color.

Limitations: Species limitations apply. Sensitive to drought conditions. Ash decline or dieback, which has complex causes, has become common in some localities. Other diseases usually are not very severe. Susceptible to borers, flower gall, sawfly, scale insects, bark splitting, leaf rusts, leaf spots, and cankers. Some problems with graft incompatibility have been observed with all cultivars.

Site and Culture: Species information applies. Transplants readily. Soil preferably moist and well drained, somewhat acid to neutral. Tolerates partial shade.

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Autumn Purple White Ash

Edward R. Hasselkus, University of Wisconsin

Donald R. Selinger, Bailey Nurseries

Donald R. Selinger, Bailey Nurseries

Champaign County White Ash

Fx am CC

Fraxinus americana **'Champaign County'**
P.P. 3762

Height:	50′ to 60′ (45′ at age 30)
Width:	40′ to 50′ (30′ at age 30)
Hardiness Zone:	5 to 8
Crown:	broadly ovate, uniformly dense, medium texture
Foliage:	shiny dark green, leathery leaves; yellow to purplish in fall, two weeks later than other white ash cultivars
Flowers:	inconspicuous
Fruit:	no seed has been observed
Description:	Selected as a seedling in Illinois, and introduced in 1975. Grows very vigorously, develops a stout trunk and good branch structure.
Advantages:	Improved in vigor, branching habit, foliage, fall color, and seedlessness.
Limitations:	Less hardy than other cultivars. Species limitations also apply. Sensitive to drought conditions. Ash decline or dieback, which has complex causes, has become common in some localities. Other diseases usually are not very severe. Susceptible to borers, flower gall, sawfly, scale insects, bark splitting, leaf rusts, leaf spots, and cankers. Some problems with graft incompatibility have been observed with all cultivars.
Site and Culture:	Species information applies. Transplants readily. Soil preferably moist and well drained, somewhat acid to neutral. Tolerates partial shade.
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Champaign County White Ash

Henry D. Gerhold, Penn State University

Willet N. Wandell,
Discov-Tree Research

Willet N. Wandell, Discov-Tree Research

Rosehill White Ash

Fx am Rs

Fraxinus americana **'Rosehill'**
P.P. 2678

Height:	50′ to 65′ (45′ at age 30)
Width:	35′ to 45′ (30′ at age 30)
Hardiness Zone:	5 to 8
Crown:	narrowly conical, becoming broader and rather open; medium texture
Foliage:	bronze-red fall color sometimes not as impressive as other cultivars
Flowers:	inconspicuous, male
Fruit:	seedless

Description: A seedling selection from Missouri, it was introduced in 1966. Branches are sturdy and more sparsely arranged. It develops a comparatively narrow, open crown.

Advantages: Uniform branch arrangement, narrow form, good fall color, and seedlessness.

Limitations: Species limitations apply. Sensitive to drought conditions. Ash decline or dieback, which has complex causes, has become common in some localities. Other diseases usually are not very severe. Susceptible to borers, flower gall, sawfly, scale insects, bark splitting, leaf rusts, leaf spots, and cankers. Some problems with graft incompatibility have been observed with all cultivars.

Site and Culture: Species information applies. Transplants readily. Soil preferably moist and well drained, somewhat acid to neutral. Tolerates partial shade.

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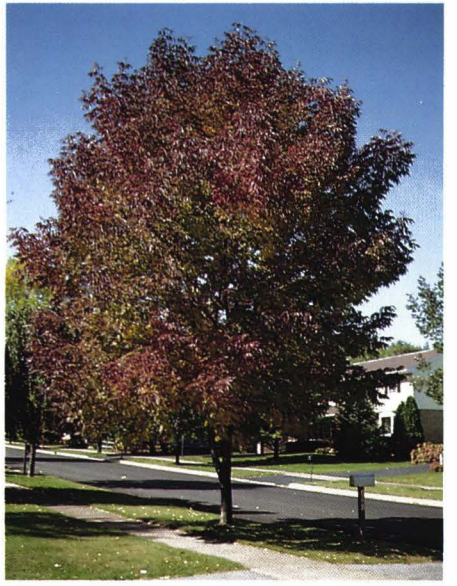
Rosehill White Ash

Henry D. Gerhold, Penn State University



Henry D. Gerhold,
Penn State University

Henry D. Gerhold,
Penn State University

Skyline White Ash

Fx am Sk

Fraxinus americana **'Skycole'**
P.P. 4756, registered

Height: 50′ to 60′ (45′ at age 30)
Width: 40′ to 50′ (35′ at age 30)
Hardiness Zone: 4 to 8

Crown: ovate, medium texture
Foliage: glossy green, turning bronze to orange-red in fall
Flowers: inconspicuous, male
Fruit: seedless

Description: Introduced in 1981 in Ohio, it has a symmetrical form, a central leader, and ascending branches. Growth rate is moderate.

Advantages: Seedless, and claimed to require low maintenance.

Limitations: May be difficult to find in some regions. Species limitations apply. Sensitive to drought. Ash dieback or decline, which has complex causes, has become common in some localities. Other diseases usually are not very severe. Susceptible to borers, flower gall, sawfly, scale insects, bark splitting, leaf rusts, leaf spots, and cankers. Some problems with graft incompatibility have been observed with all cultivars.

Site and Culture: Species information applies. Transplants readily. Soil preferably moist and well drained, somewhat acid to neutral. Tolerates partial shade.

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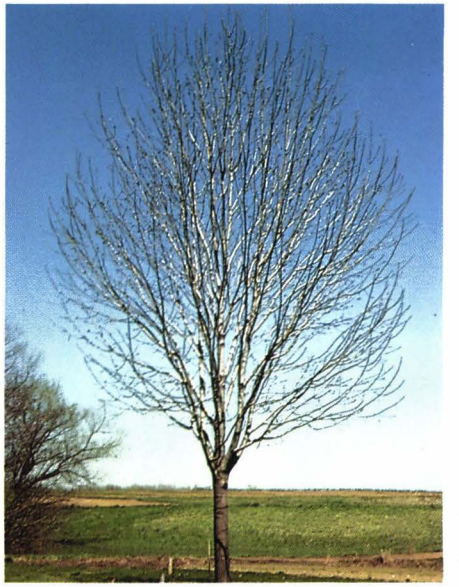
Skyline White Ash

William H. Collins, Plant Materials Consultant



William H. Collins,
Plant Materials Consultant

William H. Collins,
Plant Materials Consultant

Green Ash

Fx pa

Fraxinus pennsylvanica

Height: 40′ to 65′ (45′ at age 30)
Width: 35′ to 55′ (40′ at age 30)
Hardiness Zone: 2 to 9

Crown: broadly ovate to globose, irregular, medium-coarse texture
Foliage: compound, 3″ to 5″ leaflets, yellow in fall
Flowers: inconspicuous
Fruit: 1″ to 2″ samaras on female trees

Description: Grows on wet to dry soils of many types throughout the Great Plains and eastern U.S. into Canada. Its branching is usually coarse and irregular. Bark is gray-brown with shallow fissures and scaly ridges. The growth rate is fast.

Advantages: Withstands wide range of urban stresses. Sometimes used to replace elms, though the over-arching effect is not as graceful. Medium shade permits grass to grow underneath.

Limitations: Prone to storm damage, and therefore requires frequent pruning. Susceptible to borers and scale insects, sometimes sawfly, leafspots, and cankers. Abundant seeds and flower galls can be a nuisance on female trees.

Site and Culture: Transplants readily. Tolerates acid to alkaline soils, salt, drought, and compaction. Careful pruning of trees grown from seed is needed to eliminate weak branch structure as the crown develops.

Cultivars: The superior crown form and branching habit of cultivars is especially desirable, along with the seedless habit of male trees and darker, shiny leaves.

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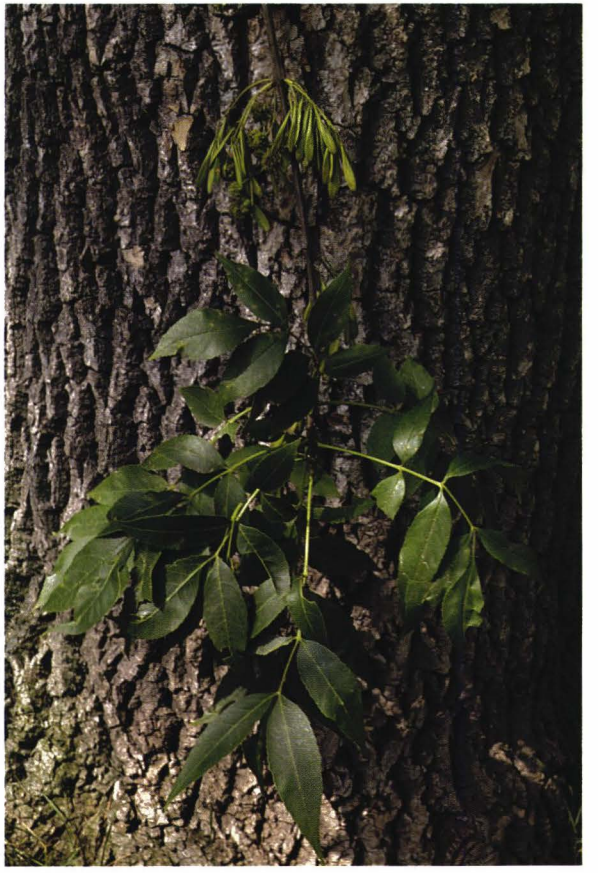
Green Ash

Henry D. Gerhold, Penn State University



Henry D. Gerhold,
Penn State University

Marshall Seedless Green Ash

Fx pa MS

Fraxinus pennsylvanica **'Marshall Seedless'**

Height: 45′ to 55′ (45′ at age 30)
Width: 35′ to 45′ (35′ at age 30)
Hardiness Zone: 3 to 8

Crown: broadly conical, medium texture
Foliage: glossy dark green, yellow in fall
Flowers: inconspicuous
Fruit: usually but not always seedless

Description: Originated in Utah about 1946, and was the first seedless green ash to be marketed. It has been a standard of the nursery industry for more than three decades, but is declining in popularity. The cultivar may consist of several clones, not all of which are male nor seedless. It has fast growth and good, symmetrical form.

Advantages: Improved form, leaves, vigor, and partial seedlessness. It has fewer insect and disease problems than the species, and tolerates urban conditions.

Limitations: Young trees are prone to borer attacks. It is not always completely seedless. Species limitations also apply. Prone to storm damage, and therefore requires frequent pruning. Susceptible to borers and scale insects, sometimes sawfly, leafspots, and cankers. Abundant seeds and flower galls can be a nuisance on female trees.

Site and Culture: Species information applies. Transplants readily. Tolerates acid to alkaline soils, salt, drought, and compaction.

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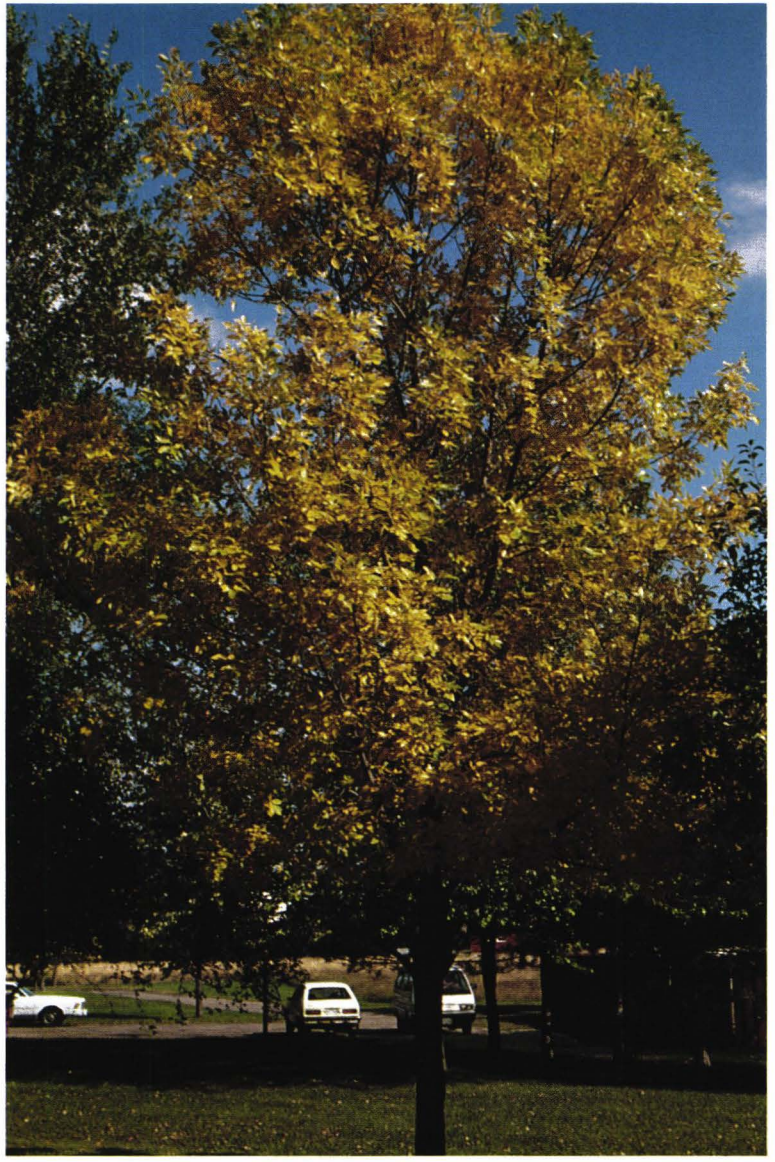
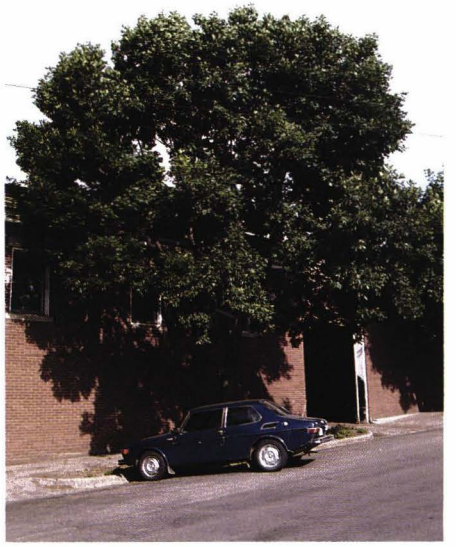
Marshall Seedless Green Ash



Donald R. Selinger, Bailey Nurseries

William H. Collins,
Plant Materials Consultant



Keith Warren,
J. Frank Schmidt & Son

Patmore Green Ash

Fx pa Pt

Fraxinus pennsylvanica **'Patmore'**
P.P. 4684

Height: 50′ to 60′ (45′ at age 30)
Width: 40′ to 50′ (35′ at age 30)
Hardiness Zone: 3 to 8

Crown: broadly ovate, medium texture
Foliage: very shiny leaves, turn yellow in the fall and persist later than most other cultivars
Flowers: inconspicuous, male
Fruit: seedless

Description: Discovered as a seedling in Manitoba, Canada and introduced in 1975. It has a pleasing form, vigorous growth, a straight trunk, and excellent branch structure.

Advantages: Improved growth habit, foliage, and seedlessness. It tolerates adverse conditions, is very hardy in colder zones, is relatively pest free, and makes a good street tree.

Limitations: Species limitations apply. Susceptible to borers and scale insects, sometimes sawfly, leafspots, and cankers.

Site and Culture: Species information applies. Transplants readily. Tolerates acid to alkaline soils, salt, drought, and compaction.

Notes:

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Patmore Green Ash

Keith Warren, J. Frank Schmidt & Son

Edward R. Hasselkus, University of Wisconsin

Summit Green Ash

Fx pa Sm

Fraxinus pennsylvanica **'Summit'**

Height: 50′ to 60′ (45′ at age 30)
Width: 45′ to 55′ (30′ at age 30)
Hardiness Zone: 3 to 8

Crown: ovate, becoming broader with age; medium texture
Foliage: turns golden yellow early in the fall
Flowers: inconspicuous, male and female
Fruit: samaras, crops light and infrequent

Description: Developed in Minnesota and introduced in 1957. A vigorous tree with a straight trunk and uniform upright branching, becoming broader with maturity. The bark appears rough and scaly at an earlier age than most green ash.

Advantages: Improved trunk, branching, and vigor. Thicker bark makes it more resistant to mechanical injury.

Limitations: Subject to oyster shell scale and flower gall. Species limitations also apply. Susceptible to borers and scale insects, sometimes sawfly, leafspots, and cankers. Abundant seeds and flower galls can be a nuisance on female trees.

Site and Culture: Species information applies. Transplants readily. Tolerates acid to alkaline soils, salt, drought, and compaction. Careful pruning of trees grown from seed is needed to eliminate weak branch structure as the crown develops.

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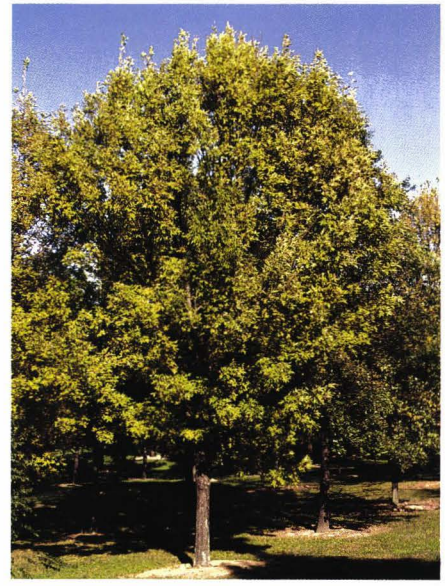
Summit Green Ash

Edward R. Hasselkus, University of Wisconsin



William Hendricks, Klyn Nurseries

Donald R. Selinger, Bailey Nurseries

Urbanite Green Ash

Fx pa Ur

Fraxinus pennsylvanica **'Urbanite'**
P.P. 6215, trademarked

Height: 50′ to 60′ (40′ at age 30)
Width: 35′ to 45′ (30′ at age 30)
Hardiness Zone: 6 to 8.

Crown: conical, dense, medium texture
Foliage: leathery, lustrous dark green leaves, deep bronze-red in fall
Flowers: inconspicuous; scant crop of male flowers
Fruit: none observed

Description: Developed in Illinois, it was introduced in 1987. The crown is dense with abundant fastigiate branching. Bark becomes furrowed at an early age. Has characteristics of ashes formerly known as red ash, a southern variety of green ash.

Advantages: A full-crowned tree with a pleasing growth habit. The parent tree has remained vigorous under city conditions and limited root space.

Limitations: Not widely tried yet, so presumably it has the same limitations as the species. Susceptible to borers and scale insects, sometimes sawfly, leafspots, and cankers. Damage from ice storms has been reported.

Site and Culture: Species information applies. Transplants readily. Tolerates acid to alkaline soils, salt, drought, and compaction. Careful pruning of trees grown from seed is needed to eliminate weak branch structure as the crown develops.

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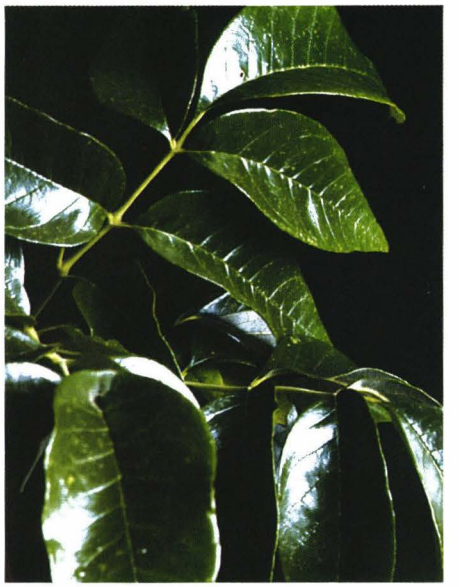
Urbanite Green Ash

Willet N. Wandell, Discov-Tree Research



Willet N. Wandell, Discov-Tree Research

Willet N. Wandell, Discov-Tree Research

Ginkgo or Maidenhair Tree

Gi bi

Ginkgo biloba

Height: 50′ to 80′ (35′ at age 30)
Width: 40′ to 80′ (30′ at age 30)
Hardiness Zone: 4 to 8

Crown: variable and irregular, large spreading branches, medium texture
Foliage: distinctive fan shape, 1½″ to 3½″, clear yellow in fall
Flowers: inconspicuous; trees are male or female
Fruit: found on female trees only; plum-like, fleshy covering of nut has a strong, offensive odor

Description: Native now to a few localities in China, this ancient species flourished in Asia, Australia, and North America 200 million years ago. The irregular form of young trees develops into various shapes with spreading branches and massive, commonly ascending forked trunks. Growth slow for about 15 years, then medium. Leaf fall is completed within a few days.

Advantages: A distinctive tree in appearance and historical interest. Unusually free of pests and tolerant of urban conditions.

Limitations: The obnoxious smell and messiness of the fruit, which seldom occurs before age 20, limits its usefulness to male clones. Adequate space is needed for this large tree, though some cultivars are more narrow. Fruit can cause dermatitis in some people.

Site and Culture: Transplants readily, but takes several years to recover. Tolerates a wide range of soils, salt, and pollutants. Requires little maintenance except some pruning. Early pruning significantly improves branching.

Cultivars: For street trees, only male clones which have been selected for fruitlessness, improved branching, and crown form should be used. Fruits have been reported occasionally on clones reputed to be male.

Notes:

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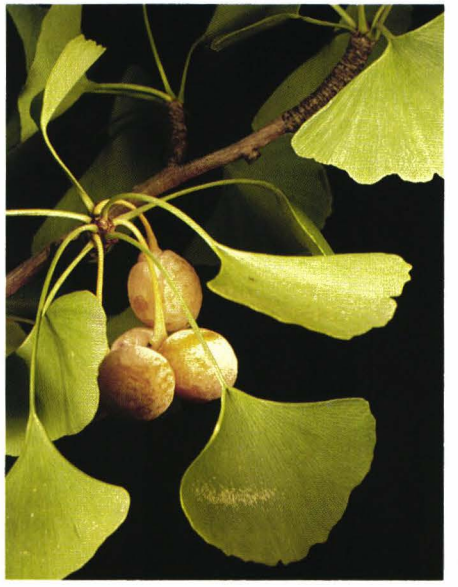
Ginkgo or Maidenhair Tree

Ohio State University

Ohio State University



Ohio State University

Autumn Gold Ginkgo

Gi bi AG

Ginkgo biloba **'Autumn Gold'**

Height:	45′ to 55′ (35′ at age 30)
Width:	30′ to 40′ (30′ at age 30)
Hardiness Zone:	4 to 8
Crown:	conical, becoming broadly ovate, medium texture
Foliage:	same as species—distinctive fan shape, 1 1/2′′ to 3½′′, clear yellow in fall
Flowers:	male, inconspicuous
Fruit:	fruitless
Description:	Introduced about 1955 in California. It has a symmetrical form when young, becoming broad, spreading, and irregular at maturity. Growth rate is slow initially, then moderate.
Advantages:	Fruitless, tolerant of urban stresses, and has excellent fall color.
Limitations:	May be difficult to find in some regions. Species limitations apply. Adequate space is needed for this large tree.
Site and Culture:	Species information applies. Transplants readily, but takes several years to recover. Tolerates a wide range of soils, salt, and pollutants. Requires little maintenance except some pruning. Early pruning significantly improves branching.
Notes:	

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Autumn Gold Ginkgo

Keith Warren, J. Frank Schmidt & Son

Lowell A. Cordes,
Saratoga Horticultural Foundation

Keith Warren,
J. Frank Schmidt & Son

Lakeview Ginkgo

Gi bi Lk

Ginkgo biloba **'Lakeview'**

Height:	45′ to 55′ (35′ at age 30)
Width:	25′ to 35′ (20′ at age 30)
Hardiness Zone:	4 to 8
Crown:	narrowly conical, frequently irregular; medium texture
Foliage:	same as species—distinctive fan shape, 1½″ to 3½″, clear yellow in fall
Flowers:	male, inconspicuous
Fruit:	fruitless
Description:	Introduced in 1959, it had been selected in Ohio for its compact, conical form.
Advantages:	It is adapted to urban sites where space is limited, and it is fruitless.
Limitations:	Species limitations apply. Adequate space is needed for this large tree.
Site and Culture:	Species information applies. Transplants readily, but takes several years to recover. Tolerates a wide range of soils, salt, and pollutants. Requires little maintenance except some pruning. Early pruning significantly improves branching.
Notes:	

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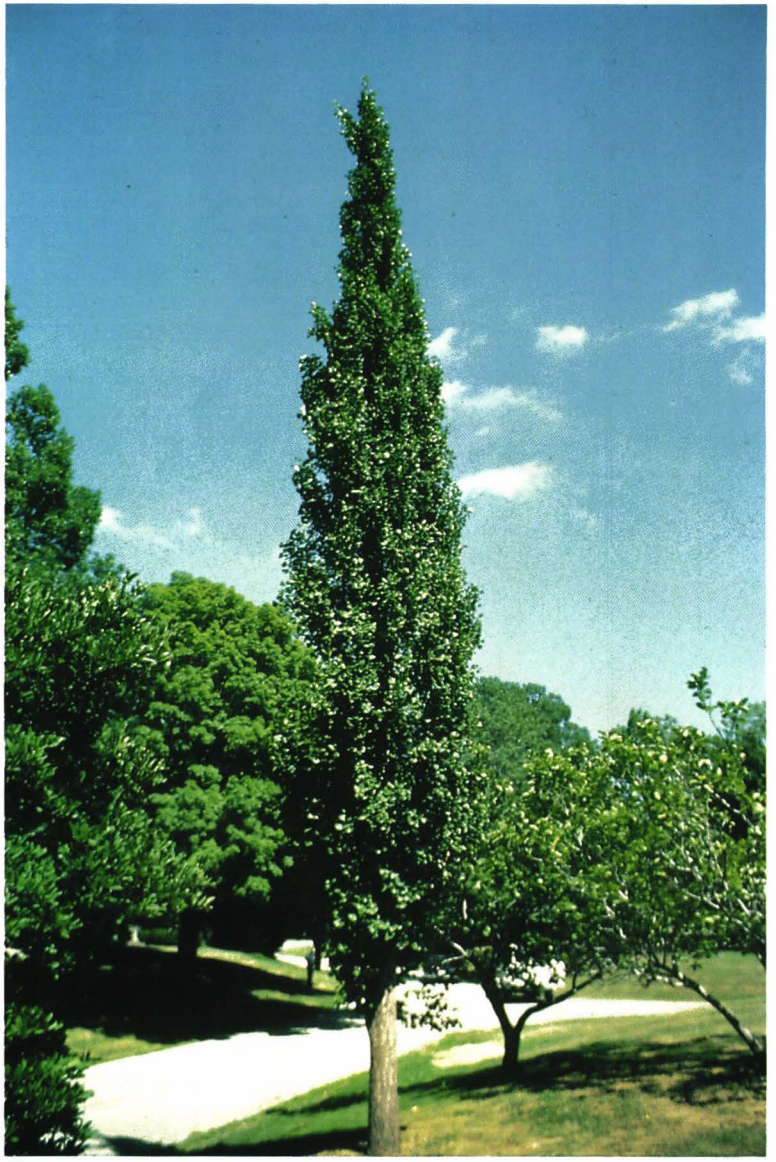
Lakeview Ginkgo



James W. Zampini, Lake County Nursery

Edward R. Hasselkus, University of Wisconsin

Henry D. Gerhold, Penn State University

Princeton Sentry Ginkgo

Gi bi PS

Ginkgo biloba **'PNI 2720'**
P.P.2726

Height:	55′ to 65′ (40′ at age 30)
Width:	25′ to 30′ (20′ at age 30)
Hardiness Zone:	4 to 8
Crown:	narrowly conical, medium texture
Foliage:	same as species - distinctive fan shape 1½″ to 3½″, clear yellow in fall
Flowers:	male, inconspicuous
Fruit:	fruitless
Description:	Introduced in 1967, this seedling was selected from *'Fastigiata'* in New Jersey for its narrow, dense form.
Advantages:	It is adapted to urban sites where space is limited, and it is fruitless.
Limitations:	Species limitations apply. Adequate space is needed for this large tree.
Site and Culture:	Species information applies. Transplants readily, but takes several years to recover. Tolerates a wide range of soils, salt, and pollutants. Requires little maintenance except some pruning. Early pruning significantly improves branching.
Notes:	

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Princeton Sentry Ginkgo

William Flemer III, Princeton Nurseries

Henry D. Gerhold,
Penn State University

Henry D. Gerhold,
Penn State University

Honeylocust

Gl tr

Gleditsia triacanthos

Height: 40′ to 80′ (50′ at age 30)
Width: 40′ to 70′ (50′ at age 30)
Hardiness Zone: 4 to 9

Crown: broadly ovate, open, spreading, fine texture
Foliage: compound, ½″ to 1½″ leaflets, yellow in fall, leaves fall early
Flowers: inconspicuous
Fruit: long brown pods, but few on most cultivars

Description: Native on a variety of sites in central and southcentral U.S., it is very thorny, has spreading branches, and usually a short trunk. Bark is gray to black, and separated by fissures into plates. Rapid growth rate and intolerant to shade.

Advantages: Delicate leaflets impart a lacy appearance, provide light shade, and are easily cleaned in the fall. Grass grows well underneath. Suited for plazas, parking lots, and spacious streets. Tolerates urban conditions.

Limitations: This tree was planted extensively for some years, especially where Dutch elm disease was prevalent. There is some concern that diseases and insects, not serious at first, are becoming more common. Susceptible to webworm, borer, plant bugs, pod gall midge, spider mite, leaf spot (can be serious in southern states), cankers, and powdery mildew. *Thyronectria* can be serious in stressful environments. Nevertheless, trees generally are able to withstand injuries.

Site and Culture: Transplants readily. Adaptable to a wide range of soils. Tolerates salt, heat, drought, compaction, and other adverse urban conditions. Prefers full sun.

Cultivars: Many cultivars have been selected mainly for better crown form, and have been propagated as thornless trees without pods. Others were selected for yellow or purplish foliage. Only thornless cultivars should be planted as street trees to prevent injuries to pedestrians.

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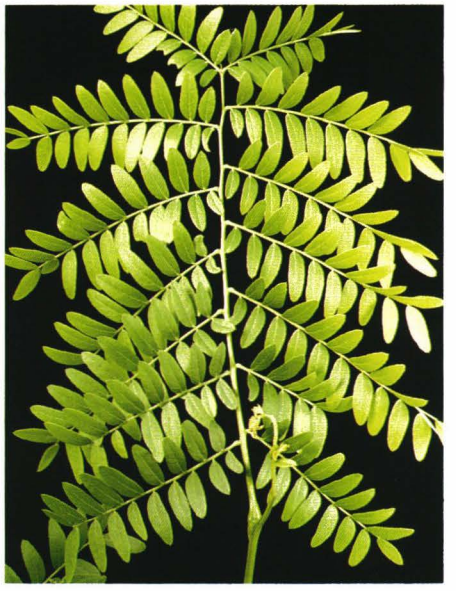
Honeylocust

Ohio State University



Ohio State University

Ohio State University

Imperial Honeylocust

Gl tr Im

Gleditsia triacanthos **'Impcole'**
P.P. 1605, trademarked

Height: 30′ to 40′ (35′ at age 30)
Width: 35′ to 45′ (35′ at age 30)
Hardiness Zone: 4 to 8

Crown: broadly globose, fine texture
Foliage: bright green
Flowers: inconspicuous
Fruit: usually fruitless

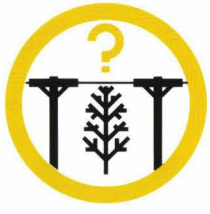
Description: It was selected in Ohio and introduced in 1957. Its horizontal branches are symmetrically arranged to form a dense, widespreading crown. It is a tidy-looking tree at all sizes.

Advantages: Matures at a lower height than most other cultivars. It is free of thorns and usually fruitless. May be partially resistant to *Thyronectria.*

Limitations: More subject to plant bugs than other cultivars. Species limitations also apply. Susceptible to webworm, borer, plant bugs, pod gall midge, spider mite, leaf spot (can be serious in southern states), cankers, and powdery mildew. Nevertheless, trees generally are able to withstand injuries.

Site and Culture: Species information applies. Transplants readily. Adaptable to a wide range of soils. Tolerates salt, heat, drought, compaction, and other adverse urban conditions. Prefers full sun.

Notes:



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Imperial Honeylocust

Edward R. Hasselkus, University of Wisconsin

Henry D. Gerhold, Penn State University

Moraine Honeylocust

Gl tr Mo

Gleditsia triacanthos **'Moraine'**
P.P. 836

Height: 60′ to 70′ (50′ at age 30)
Width: 50′ to 60′ (40′ at age 30)
Hardiness Zone: 4 to 9

Crown: broadly ovate, irregular, and somewhat vase-shaped; fine texture
Foliage: denser than the species
Flowers: inconspicuous
Fruit: usually fruitless

Description: This seedling selection originated in Ohio in 1949. It has remained popular despite many subsequent introductions. Its outline is broad and irregular. Upper branches are ascending and the lower ones are more pendulous.

Advantages: In addition to being thornless and usually fruitless, it has some resistance to mimosa webworm and plant bugs.

Limitations: Susceptible to storm damage. This plant has some resistance to webworm and plant bugs, otherwise limitations are the same as for the species. Susceptible to borer, pod gall midge, spider mite, leaf spot (can be serious in southern states), cankers, and powdery mildew. *Thyronectria* can be serious in northern and western states. Nevertheless, trees generally are able to withstand injuries.

Site and Culture: Species information applies. Transplants readily. Adaptable to a wide range of soils. Tolerates salt, heat, drought, compaction, and other adverse urban conditions. Prefers full sun.

Notes:

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Moraine Honeylocust

Keith Warren, J. Frank Schmidt & Son

Henry D. Gerhold, Penn State University

Shademaster Honeylocust

Gl tr Sh

Gleditsia triacanthos **'PNI 2835'**
P.P. 1515, trademarked

Height: 60′ to 70′ (50′ at age 30)
Width: 50′ to 60′ (40′ at age 30)
Hardiness Zone: 4 to 9

Crown: broadly ovate to irregularly vase-shaped, fine texture
Foliage: deep dark green, persists late in fall turning yellow-green
Flowers: inconspicuous
Fruit: produces a few pods infrequently

Description: A seedling selected in New Jersey, it was introduced in 1956. A vigorous grower with a straight trunk and graceful ascending branches. More vase-shaped as a young tree than the species.

Advantages: Improved vigor, superior growth habit of young and older trees, absence of thorns, and reduced fruiting. May be partically resistant to *Thyronectria.*

Limitations: Some ice damage has been reported. Species limitations also apply. Susceptible to webworm, borer, plant bugs, pod gall midge, spider mite, leaf spot (can be serious in southern states), cankers, and powdery mildew. Nevertheless, trees generally are able to withstand injuries.

Site and Culture: Species information applies. Transplants readily. Adaptable to a wide range of soils. Tolerates salt, heat, drought, compaction, and other adverse urban conditions. Prefers full sun.

Notes;

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Shademaster Honeylocust

Keith Warren, J. Frank Schmidt & Son

Skyline Honeylocust

Gl tr Sk

Gleditsia triacanthos **'Skycole'**
P.P. 1619, trademarked

Height: 65′ to 75′ (50′ at age 30)
Width: 55′ to 65′ (40′ at age 30)
Hardiness Zone: 4 to 9

Crown: broadly ovate, fine texture
Foliage: large, dark green leaflets; golden yellow fall color
Flowers: inconspicuous
Fruit: reduced fruiting

Description: A seedling selected in Ohio, it was introduced in 1957. It has a strong central leader and tight upright branching, giving a more compact appearance than other cultivars.

Advantages: Somewhat resistant to plant bugs and leafhoppers, in addition to being thornless and having reduced fruiting. It is easy to limb-up for high clearance, and has better fall color than other cultivars.

Limitations: Except for its insect resistance species limitations apply. Susceptible to webworm, borer, plant bug, pod gall midge, spider mite, leaf spot (can be serious in southern states), cankers, and powdery mildew. *Thyronectria* can be serious in stressful environments. Nevertheless, trees generally are able to withstand injuries.

Site and Culture: Species information applies. Transplants readily. Adaptable to a wide range of soils. Tolerates salt, heat, drought, compaction, and other adverse urban conditions. Prefers full sun.

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Skyline Honeylocust

Edward R. Hasselkus, University of Wisconsin

William H. Collins,
Plant Materials Consultant

Donald R. Selinger, Bailey Nurseries

Kentucky Coffeetree

Gy di

Gymnocladus dioicus

Height:	55′ to 75′ (40′ at age 30)
Width:	45′ to 65′ (30′ at age 30)
Hardiness Zone:	4 to 9
Crown:	irregularly ovate, texture medium when in leaf, coarse in winter
Foliage:	doubly compound, 2″ to 3″ bluish-green leaflets, yellow in fall
Flowers:	greenish- or yellowish-white clusters, 8″ to 12″ on female trees, 3″ to 4″ on male trees, not conspicuous
Fruit:	4″ to 10″ reddish-brown pods on female trees
Description:	An uncommon tree throughout its range on moist sites in central U.S. Older trees usually have several large, ascending limbs and sparse lateral branching. Bark is gray brown with distinctive curled scales. Intolerant to shade. Medium to fast growth rate. Male trees are usually more upright.
Advantages:	When mature this tree has a stark, picturesque silhouette in winter and gives light shade in summer. Grass grows well underneath. It is planted as a specimen tree in lawns and sometimes as a street tree. Adaptable to urban conditions.
Limitations:	Sparse irregular branching when young. Shedding of pods and leaves at different times can cause a cleanup problem in some situations. Remarkably free of diseases and insects. Roots will sucker when disturbed.
Site and Culture:	Requires full sun. Tolerates a wide range of urban sites, including alkaline soil, salt, and drought. Transplant B&B. Slow recovery after transplanting.
Cultivars:	None.
Notes:	

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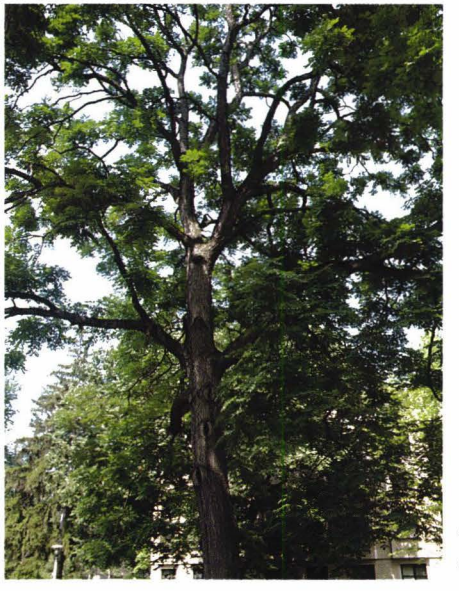
Kentucky Coffeetree

Henry D. Gerhold, Penn State University

William Hendricks,
Klyn Nurseries



Henry D. Gerhold,
Penn State University

Goldenrain Tree

Ko pn

Koelreuteria paniculata

Height:	25′ to 40′ (35′ at age 30)
Width:	25′ to 40′ (35′ at age 30)
Hardiness Zone:	5 to 9
Crown:	broadly globose, medium texture
Foliage:	compound, 1½″ to 3″ feathery, blue-green leaflets, purplish in spring, yellow in fall
Flowers:	numerous, bright yellow, lacy, foot-long spikes in midsummer, slightly fragrant
Fruit:	bladder-like papery green capsules, persistent and turning brown

Description: Introduced from China, this medium size tree is quite adaptable to a range of sites, including seacoast environments. Branches are sparse and ascending. Bark is light brown and furrowed on older trees. Growth rate is medium.

Advantages: Valued chiefly for its yellow flowers, graceful form, and tolerance of urban conditions. It makes an excellent lawn specimen and is also useful as a street tree. No serious diseases or insects have been reported.

Limitations: Looks somewhat gaunt when young. Infrequently susceptible to coral spot canker, leaf spot, *Verticillium* wilt, and scale insects.

Site and Culture: Transplants well, but only in the spring. It is adaptable to a wide range of soils, including alkaline; and is tolerant of drought, heat, and pollutants. Requires occasional pruning to remove dead wood and to maintain shape. Trees from northern seed sources should be used in northern zones.

Cultivars: A few have been selected, e.g. 'September', but production is quite limited.

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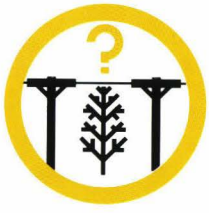

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Goldenrain Tree

Henry D. Gerhold, Penn State University

William Hendricks,
Klyn Nurseries

Henry D. Gerhold,
Penn State University

Sweetgum

Li st

Liquidambar styraciflua

Height: 50′ to 75′ (45′ at age 30)
Width: 40′ to 65′ (30′ at age 30)
Hardiness Zone: 5 to 9

Crown: conical changing to ovate, medium texture
Foliage: 4″ to 7″, glossy green, star shaped; brilliant variable shades of green, yellow, scarlet, and purple in fall
Flowers: inconspicuous
Fruit: woody ball of peaked capsules, 1″ to 1 1/2″

Description: Native to lowland, moist sites in southeastern U.S., and extending into some more northerly states. Has a straight trunk, grayish bark, and corky ridges on twigs. The root system is shallow and widespreading. Growth rate is medium to fast.

Advantages: A fine tree for lawns or streets where space is adequate. Popular because of its bright fall colors and symmetrical crown when young.

Limitations: Cold winters near northern limit can cause delayed leafing out and dieback. Iron chlorosis occurs at high pH. Fruits are considered a nuisance or liability by some. Susceptible to bleeding necrosis of bark, leaf spots, webworm, caterpillars, and scale. In the South large branches may drop off suddenly.

Site and Culture: Obtain plants from the nearest local or more northerly seed source. Transplant B&B in the spring; re-establishes slowly. Requires acid soil, full sun, and adequate space for roots.

Cultivars: Though various cultivars are available, seedlings are planted most commonly. 'Moraine' is reputed to be the most cold hardy, and has good form and leaf characteristics. 'Gold Dust' is also cold hardy whereas 'Festival' and 'Burgundy' are reputed to be less cold hardy and adapted to warmer climates (zones 8 to 9).

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Sweetgum

William H. Collins, Plant Materials Consultant

Ohio State University

Ohio State University

Gold Dust Sweetgum

Li st GD

Liquidambar styraciflua **'Goduzam'**
trademarked

Height:	55′ to 65′ (50′ at age 30)
Width:	40′ to 45′ (35′ at age 30)
Hardiness Zone:	5 to 9
Crown:	conical, changing to ovate, medium texture
Foliage:	4″ to 7″, star shaped, yellow and green variegated, pink and burgundy in fall
Flowers:	inconspicuous
Fruit:	woody ball of peaked capsules, 1″
Description:	Introduced about 1915 in Ohio, it is distinctive mainly because of its foliage color. Growth rate is moderate.
Advantages:	Can add a bright, contrasting color to the landscape during the summer. In addition it has the symmetrical crown and brilliant fall colors typical of the species. There is some evidence of greater winter hardiness than other cultivars.
Limitations:	May be difficult to find. Most species information applies. Iron chlorosis occurs at high pH. Large woody fruits are considered a nuisance or liability by some. Susceptible to leaf spots, webworm, caterpillars, and scale.
Site and Culture:	Transplant B&B in the spring; re-establishes slowly. Requires acid soil, full sun, and adequate space for roots.
Cultivars:	'Aurea', 'Golden', and 'Variegata' have similar leaf characteristics, and are believed to be the same cultivar as 'Goduzam'.
Notes:	

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Gold Dust Sweetgum

Henry D. Gerhold, Penn State University

James W. Zampini,
Lake County Nursery

Henry D. Gerhold, Penn State University

Moraine Sweetgum

Li st Mo

Liquidambar styraciflua **'Moraine'**
P.P. 4601, trademarked

Height: 55′ to 65′ (55′ at age 30)
Width: 40′ to 50′ (40′ at age 30)
Hardiness Zone: 5 to 9

Crown: conical, changing to ovate, medium texture
Foliage: 4″ to 7″, star shaped, glossy dark green, brilliant red, yellow, and burgundy in fall
Flowers: inconspicuous
Fruit: woody ball of peaked capsules, 1″ to 1½″

Description: Selected along a street in Indiana and introduced in 1980. It is described as more uniform and faster growing than the species, and is more winter hardy.

Advantages: Uniformity of shape, excellent foliage, winter hardiness, and faster growth, in addition to the bright fall colors typical of the species.

Limitations: May be difficult to find. Most species information applies. Iron chlorosis occurs at high pH. Large woody fruits are considered a nuisance or liability by some. Susceptible to leaf spots, webworm, caterpillars, and scale.

Site and Culture: Transplant B&B in the spring; re-establishes slowly. Requires acid soil, full sun, and adequate space for roots.

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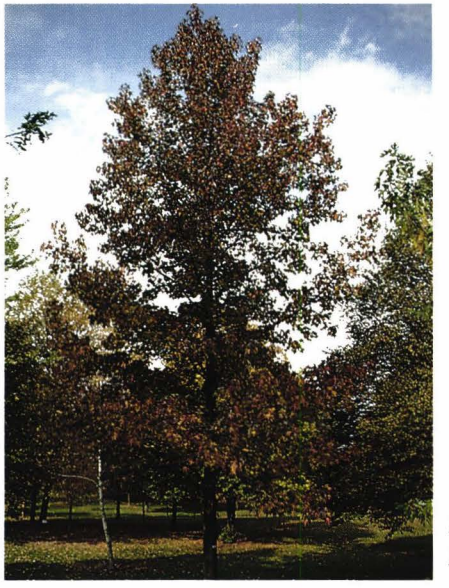
Moraine Sweetgum

Henry D. Gerhold, Penn State University



Henry D. Gerhold,
Penn State University

Henry D. Gerhold, Penn State University

Tuliptree

Lr tu

Liriodendron tuliptree

Height: 70′ to 90′ (60′ at age 30)
Width: 35′ to 50′ (35′ at age 30)
Hardiness Zone: 4 to 9

Crown: conical to ovate, medium texture
Foliage: 3″ to 8″, bright green, golden yellow in fall
Flowers: 2″ to 3″, bright yellowish green and orange, tulip-shaped
Fruit: cone-like cluster of woody samaras

Description: A magnificent, very large tree in nature and on urban sites where ample space permits its full development. It grows rapidly in sheltered coves and on mesic sites in eastern and southeastern United States. The grayish brown bark has shallow light gray or tan fissures.

Advantages: Can be impressive where a very large tree is desired, such as broad boulevards, wide tree lawns near tall buildings, or in parks.

Limitations: Subject to sun-scald. Aphids secrete a fluid which can spatter on cars and blacken leaves due to sooty mold. Drought can cause premature leaf fall. Infrequent problems may be caused by cankers, powdery mildew, *Verticillium* wilt, scale insects, spot gall, and physiological leaf yellowing. Trees are weak-wooded, resulting in occasional storm breakage. Large limbs sometimes die abruptly.

Site and Culture: Trees grown from local seed sources will be better adapted to extremes of cold or heat. Transplant B&B in spring; roots are fleshy, and recovery may be slow. Prefers full sun and well-drained, moist, somewhat acid soils. Special care is needed for good survival and recovery. Soft bark is easily damaged by lawn mowers or trimmers.

Cultivars: Varieties with unusual traits have been selected, but few are of interest as street trees. 'Arnold' has a narrow, fastigiate crown.

Notes:

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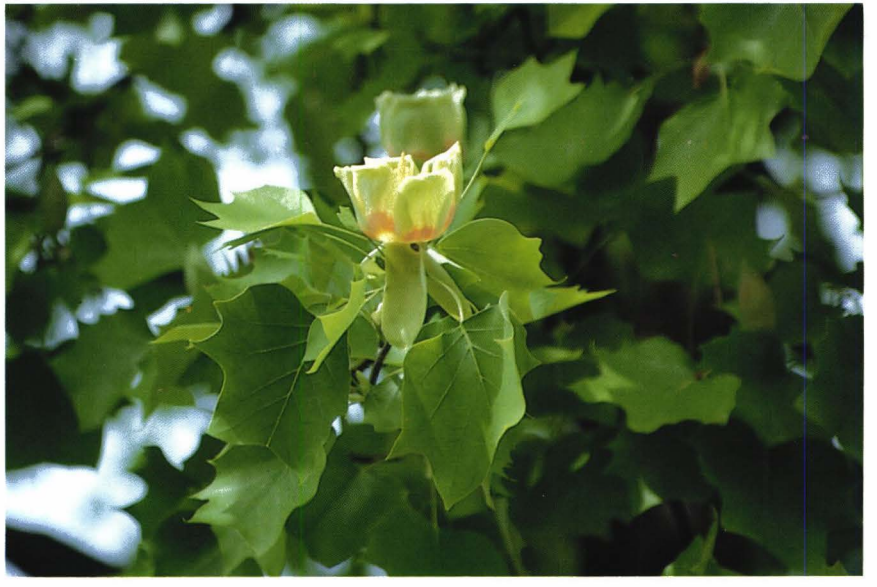
Tuliptree

Henry D. Gerhold, Penn State University

Henry D. Gerhold,
Penn State University



Henry D. Gerhold, Penn State University

Cucumbertree

Mg ac

Magnolia acuminata

Height:	50′ to 70′ (50′ at age 30)
Width:	30′ to 55′ (35′ at age 30)
Hardiness Zone:	4 to 8
Crown:	conical, developing to broadly ovate, medium-coarse texture
Foliage:	4″ to 10″, light to dark green, brown in fall
Flowers:	2″ to 3″, greenish yellow, cup-shaped, not very visible high in tree
Fruit:	bright red, resembling a small cucumber

Description: Native to eastern and southeastern United States, where it grows at a medium rate in sheltered coves and on other mesic sites. As a young tree it has a strong central leader and a regular, conical form which broadens with age.

Advantages: The attractive form and branching habit make this a good choice for large spaces, such as broad streets or parks.

Limitations: Availability is limited. Scale insects occur infrequently, but can cause severe damage. Sensitive to drought, poor drainage, and *Verticillium* wilt.

Site and Culture: Transplant B&B in spring; roots are fleshy, so recovery may be slow. Tolerates full sun or partial shade and calcareous soils. Prefers rich, moist, well drained soil.

Cultivars: 'Elizabeth' (P.P. 4145), a hybrid of *M. acuminata* x *M. denudata,* has clear yellow flowers at an early age, tends to be somewhat shrubby, and in northern locations attains a height of about 25′ at age 30. Several other selections have been made for flower traits.

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Cucumbertree

Edward R. Hasselkus, University of Wisconsin

George H. Ware,
The Morton Arboretum

Edward R. Hasselkus,
University of Wisconsin

Star Magnolia

Mg st

Magnolia stellata Tree Form

Height:	10′ to 20′ (12′ at age 30)
Width:	10′ to 15′ (12′ at age 30)
Hardiness Zone:	4 to 8
Crown:	broadly ovate, medium-fine texture
Foliage:	2″ to 4″, dark green, yellow to bronze in fall
Flowers:	3″ to 4″, white, delicate, profuse at an early age, fragrant
Fruit:	2″ aggregate of follicles

Description: More commonly grown as a shrub, it can be trained into a small tree by pruning while in the nursery. In nature it is a rare species restricted to a small region of Japan. Growth rate is slow.

Advantages: Occasionally planted as a street tree, it is more commonly used as an accent plant in the landscape or near buildings where a small, flowering tree would be appropriate; valued mainly for its attractive flowers and foliage.

Limitations: Tree form plants may be difficult to obtain. Flower buds are often killed by winter injury or spring frosts. Delicate flower petals may be damaged by harsh weather. Sensitive to *Verticillium* wilt and mechanical injury to the bark. Magnolia scale infrequently causes severe damage.

Site and Culture: Transplant B&B or as a container grown plant; has a fleshy root system, so recovery may be slow. Plant in a sheltered location, avoiding southern exposures, to minimize chance of cold injury to flower buds. Prefers moist, rich, well drained acid soil. Careful pruning may be needed to develop desired tree form while the plant is young.

Cultivars: Many cultivars have been selected for flower traits, but not street tree form.

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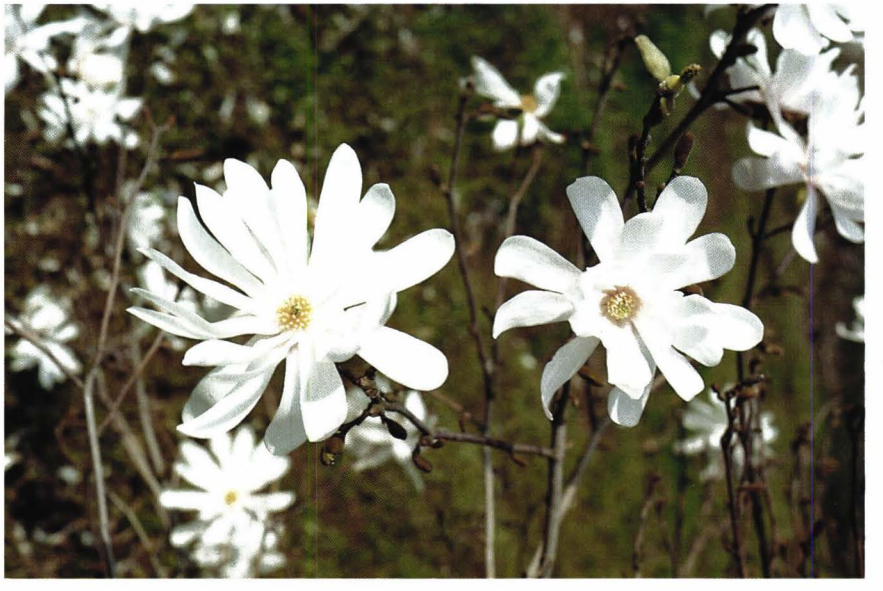
Star Magnolia

Henry D. Gerhold, Penn State University

Henry D. Gerhold,
Penn State University



Henry D. Gerhold, Penn State University

Merrill Magnolia

Mg xl Me

Magnolia x loebneri **'Merrill'** Tree Form

Height:	25′ to 40′ (30′ at age 30)
Width:	25′ to 40′ (30′ at age 30)
Hardiness Zone:	4 to 8
Crown:	broadly conical, medium-fine texture
Foliage:	3″ to 5″, dark green, yellow to bronze in fall
Flowers:	3″ to 5″, white, profuse at an early age, fragrant
Fruit:	2″ aggregate of follicles

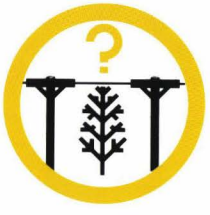
Description: Selected in Massachusetts from hybrid seedlings of *M. kobus* x *M. stellata,* and introduced in 1939. A vigorous small tree with a moderate growth rate. Attractive, profuse flowering begins at an early age.

Advantages: Valued mainly for its attractive flowers and foliage, it may be used as a street tree or a specimen plant in the landscape. It has been grown as far north as Minnesota

Limitations: Flower buds are sometimes killed by winter injury or spring frosts. Delicate flower petals may be damaged by harsh weather. Susceptible to scale insects and *Verticillium* wilt, which infrequently kill trees. May be difficult to obtain in tree form.

Site and Culture: Transplant B&B or as a container grown plant; has a fleshy root system, so recovery may be slow. Plant in a sheltered location, avoiding southern exposures, to minimize chance of cold injury to flower buds. Prefers moist, rich, well drained acid soil.

Notes:



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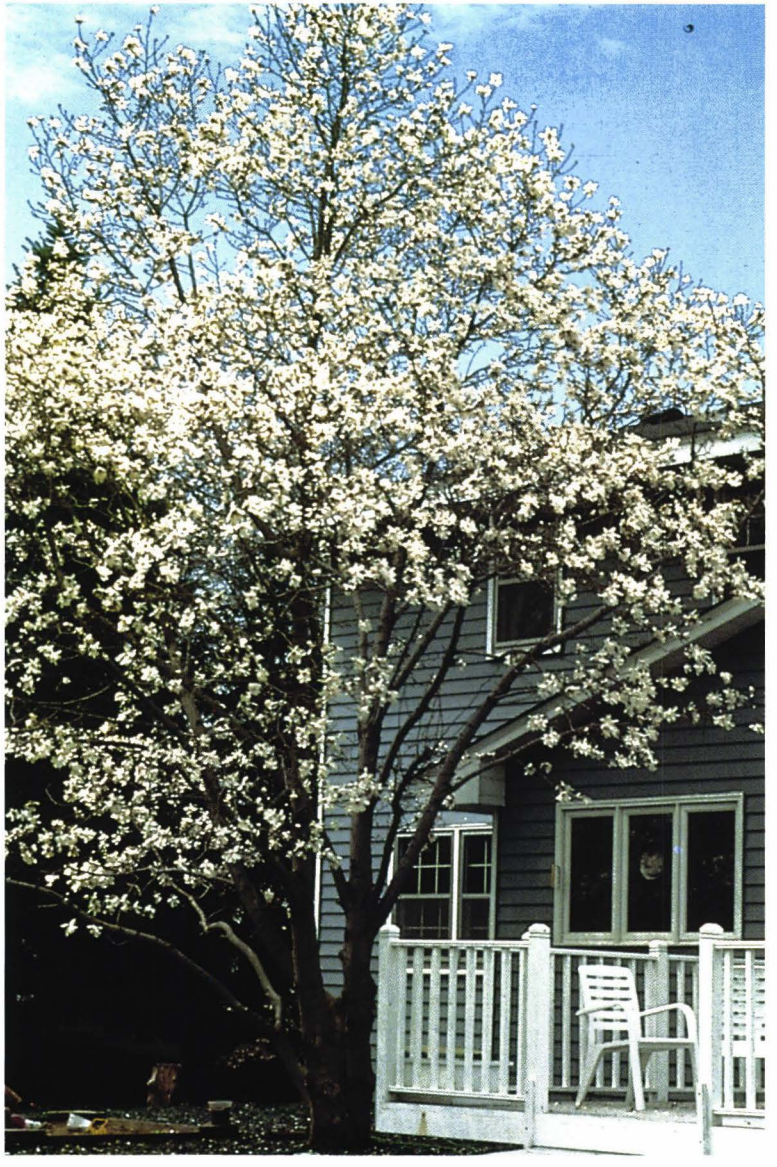
Merrill Magnolia



Donald R. Selinger, Bailey Nurseries

Henry D. Gerhold,
Penn State University

Henry D. Gerhold, Penn State University

Galaxy Magnolia

Mg xx Ga

Magnolia **'Galaxy'** Tree Form

Height:	20′ to 30′ (25′ at age 30)
Width:	10′ to 15′ (12′ at age 30)
Hardiness Zone:	6 to 8
Crown:	conical, medium-coarse texture
Foliage:	4″ to 7″, green, yellow to bronze in fall
Flowers:	6″, reddish purple to pink, profuse at early age
Fruit:	aggregate of follicles

Description: A hybrid between *M. lilliflora* 'Nigra' and *M. sprengeri* 'Diva' released 1980 by the U.S. National Arboretum. It grows rapidly, and a single straight trunk can be pruned to produce a tree form suitable for planting along streets.

Advantages: Profuse flowering, starting at an early age, is usually late enough to avoid spring frost damage.

Limitations: Fallen flowers can cause a litter problem. Has seldom been used as a street tree, so little is known about possible problems. Susceptible to scale insects and *Verticillium* wilt, which infrequently kills trees. May be difficult to obtain in tree form.

Site and Culture: Transplant B&B or container-grown plants; root system is fleshy, so recovery may be slow. Prefers full sun, and rich, moist, acid soil.

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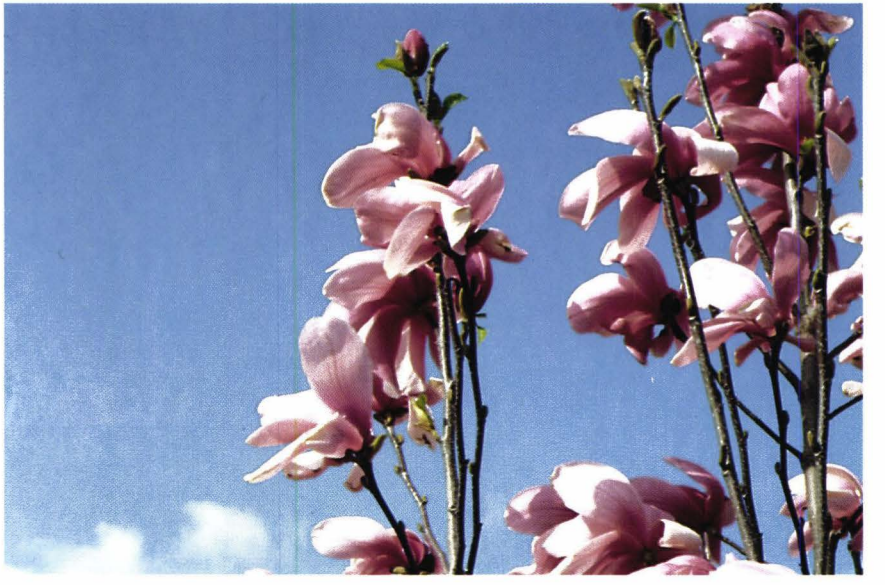
Galaxy Magnolia

Henry D. Gerhold, Penn State University

Henry D. Gerhold,
Penn State University



Henry D. Gerhold, Penn State University

Flowering Crabapple

M1

Malus (many species and hybrids)

Height: 10′ to 35′ (25′ at age 30)
Width: 10′ to 25′ (25′ at age 30)
Hardiness Zone: 2 to 8

Crown: shapes include globose, ovate, and others; medium texture
Foliage: 1″ to 2″, various shades of green or reddish green; few cultivars have fall color
Flowers: white, pink, or red; single or double
Fruit: ¼″ to 2″, various hues of red, orange, or yellow

Description: The genus contains many species indigenous to North America, Europe, and Asia. Hundreds of cultivars, representing various species and hybrids, have been selected principally for attractive flowers, fruit, and growth habit traits.

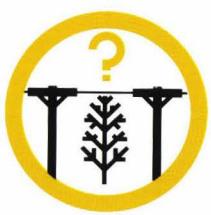
Advantages: The beautiful ornamental qualities can be deployed in many types of landscape settings. Certain cultivars can be used as street trees, as they tolerate urban conditions and their branching habit permits adequate clearance.

Limitations: Some cultivars are highly susceptible to apple scab, fireblight, or cedar- apple rust, whereas others are resistant to varying degrees. Lesser problems may be caused by canker, scale insects, borers, or aphids. Fallen fruit of some cultivars causes litter problems. Many cultivars spread in width as they mature, and therefore require adequate space.

Site and Culture: Specify tree form when ordering. Should be planted in full sun, preferably in well drained, acid soil. Adaptable to many soil types. Lower branches of street trees need to be pruned in the first few years for clearance of pedestrians and vehicles. Suckers from understock may need to be removed occasionally; suckers occur on budded plants, but may be avoided if trees are grown on their own roots from cuttings or by tissue culture, or if trees are budded on Malling III rootstocks.

Cultivars: Among the hundreds of cultivars available, those described here were chosen for high resistance to some of the more important diseases, and a branching habit desirable for street trees. Additional information is available from the International Ornamental Crabapple Society, Morton Arboretum, Lisle, Illinois 60532. The following cultivars and species, in addition to some in the following pages, have been recommended by the Society for urban use: 'Bob White', 'David', 'Donald Wyman', 'Profusion', 'Red Splendor', and *M. floribunda.*

Notes:



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Flowering Crabapple

Ohio State University

Ohio State University

Adams Crabapple

Ml xx Ad

Malus **'Adams'** Tree Form

Height:	18′ to 22′ (20′ at age 30)
Width:	20′ to 24′ (22′ at age 30)
Hardiness Zone:	4 to 8
Crown:	globose and dense, medium texture
Foliage:	red tint at emergence, then green, orange in the fall
Flowers:	1½″, carmine buds fade to pink
Fruit:	1/2″, glossy dark red, persistent until spring
Description:	Selected in Massachusetts and introduced in 1951. Growth rate is moderate.
Advantages:	Highly resistant to diseases. Attractive flowers, foliage, and fruit.
Limitations:	None serious. Slightly susceptible to scab, and fed upon by Japanese beetles.
Site and Culture:	Species information applies. Specify tree form when ordering. Should be planted in full sun, preferably in well drained, acid soil. Adaptable to many soil types. Lower branches of street trees need to be pruned in the first few years for clearance of pedestrians and vehicles. Suckers from understock may need to be removed occasionally; suckers occur on budded plants, but may be avoided if trees are grown on their own roots from cuttings or by tissue culture, or it trees are budded on rootstocks such as Malling III.
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Adams Crabapple

Donald R. Selinger, Bailey Nurseries

Donald R. Selinger, Bailey Nurseries

Donald R. Selinger, Bailey Nurseries

Centurion Crabapple

Ml xx Ce

Malus **'Centzam'** Tree Form
Trademarked

Height: 20′ to 25′ (20′ at age 30)
Width: 15′ to 20′ (15′ at age 30)
Hardiness Zone: 3 to 8

Crown: narrowly ovate, more rounded as it matures, medium texture
Foliage: dark green with a slight red overcast
Flowers: red buds open to rose-red flowers
Fruit: ½", glossy, cherry-red, persists into winter

Description: The upright branching habit is well suited to street tree use. It was selected in Indiana by crossing *M.* x *zumi 'Calocarpa'* with M. 'Almey', and was introduced in 1978.

Advantages: Improved growth habit, foliage, and flowers; tolerant of scab and resistant to fireblight.

Limitations: None serious.

Site and Culture: Species information applies. Specify tree form when ordering. Should be planted in full sun, preferably in well drained, acid soil. Adaptable to many soil types. Lower branches of street trees need to be pruned in the first few years for clearance of pedestrians and vehicles. Suckers from understock may need to be removed occasionally; suckers occur on budded plants, but may be avoided if trees are grown on their own roots from cuttings or by tissue culture, or if trees are budded on Malling III rootstocks.

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Centurion Crabapple

Donald R. Selinger, Bailey Nurseries

Keith Warren, J. Frank Schmidt & Son

James W. Zampini, Lake County Nursery

Harvest Gold Crabapple

MI xx HG

Malus **'Hargozam'** Tree Form
trademarked

Height: 20′ to 25′ (20′ at age 30)
Width: 15′ to 20′ (15′ at age 30)
Hardiness Zone: 4 to 8

Crown: moderately columnar, medium texture
Foliage: dark green
Flowers: abundant single white blossoms appear one week later in spring than other crabs
Fruit: ½″ golden fruit persists into winter

Description: A vigorous tree with an upright branching habit suitable for street tree use. It was introduced in Ohio.

Advantages: Tolerant of scab, resistant to fireblight. Improved also in form, vigor, and prolific flowering. Tolerant of aerial salt. Easily limbed up into a tree form.

Limitations: None serious.

Site and Culture: Species information applies. Specify tree form when ordering. Should be planted in full sun, preferably in well drained, acid soil. Adaptable to many soil types. Lower branches of street trees need to be pruned in the first few years for clearance of pedestrians and vehicles. Suckers from understock may need to be removed occasionally; suckers occur on budded plants, but may be avoided if trees are grown on their own roots from cuttings or by tissue culture, or if trees are budded on Malling III rootstocks.

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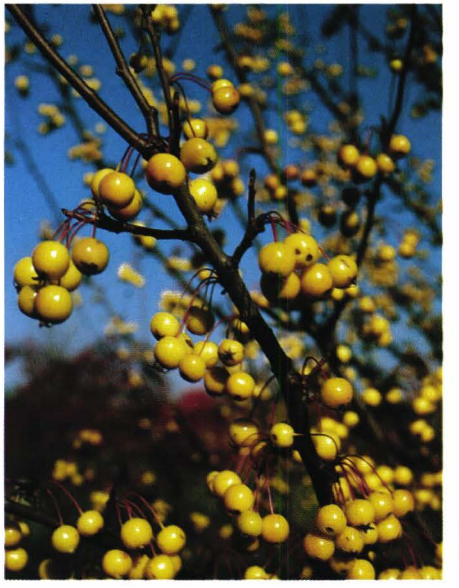
Harvest Gold Crabapple

James W. Zampini, Lake County Nursery



Edward R. Hasselkus,
University of Wisconsin

William Hendricks,
Klyn Nurseries

Madonna Crabapple

Ml xx Md

Malus **'Mazam'** Tree Form
P.P 6672, trademarked

Height: 16′ to 20′ (18′ at age 30)
Width: 8′ to 12′ (10′ at age 30)
Hardiness Zone: 4 to 8

Crown: ovate, narrow when young, compact, medium texture
Foliage: emerges bronze, turns dark green
Flowers: large double white blossoms appear early, open slowly, and remain longer than most
Fruit: ½", briefly golden with a red blush, then darkens and shrivels

Description: The tight branching habit gives an attractive silhouette in winter. The upright, compact growth habit is well suited for street tree use. It was introduced in 1987 in Ohio. Fruit persists as a "raisin" until spring.

Advantages: Improved in form, flowering, and resistance to scab.

Limitations: Susceptible to fireblight.

Site and Culture: Species information applies. Specify tree form when ordering. Should be planted in full sun, preferably in well drained, acid soil. Adaptable to many soil types. Lower branches of street trees need to be pruned in the first few years for clearance of pedestrians and vehicles. Suckers from understock may need to be removed occasionally; suckers occur on budded plants, but may be avoided if trees are grown on their own roots from cuttings or by tissue culture, or if trees are budded on Malling III rootstocks.

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Madonna Crabapple

James W. Zampini, Lake County Nursery

Henry D. Gerhold,
Penn State University

William H. Collins, Plant Materials Consultant

Prairifire Crabapple

MI xx Pr

Malus **'Prairifire'** Tree Form

Height:	18′ to 22′ (20′ at age 30)
Width:	15′ to 22′ (18′ at age 30)
Hardiness Zone:	4 to 8
Crown:	upright oval, becoming globose, medium texture
Foliage:	purple at emergence, then reddish green, bronze in fall
Flowers:	1½′′, red buds open to bright, deep pink
Fruit:	1/2′′, dark red, persistent

Description: Selected in Illinois and introduced in 1982. Growth rate is moderate. Reddish brown bark is attractive in winter.

Advantages: Highly resistant to diseases. Attractive flowers, foliage, fruit, and bark.

Limitations: None serious.

Site and Culture: Species information applies. Specify tree form when ordering. Should be planted in full sun, preferably in well drained, acid soil. Adaptable to many soil types. Lower branches of street trees need to be pruned in the first few years for clearance of pedestrians and vehicles. Suckers from understock may need to be removed occasionally; suckers occur on budded plants, but may be avoided if trees are grown on their own roots from cuttings or by tissue culture, or if trees are budded on rootstocks such as Malling III.

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Prairifire Crabapple

Donald R. Selinger, Bailey Nurseries

Henry D. Gerhold, Penn State University

Henry D. Gerhold, Penn State University

Professor Sprenger Crabapple

MI xx PS

Malus **'Professor Sprenger'** Tree Form

Height:	18′ to 22′ (20′ at age 30)
Width:	15′ to 22′ (18′ at age 30)
Hardiness Zone:	4 to 8
Crown:	upright oval, dense and spreading, medium texture
Foliage:	green
Flowers:	pink buds open to white
Fruit:	1/2″, bright orange, persistent into winter, used by wildlife
Description:	Selected in Holland and introduced in 1950. Growth rate is moderate.
Advantages:	Highly resistant to diseases. Flowers profusely, and distinctive bright orange fruit remains attractive for a long time in the fall.
Limitations:	No serious diseases or insects. Availability may be limited.
Site and Culture:	Species information applies. Specify tree form when ordering. Should be planted in full sun, preferably in well drained, acid soil. Adaptable to many soil types. Lower branches of street trees need to be pruned in the first few years for clearance of pedestrians and vehicles. Suckers from understock may need to be removed occasionally; suckers occur on budded plants, but may be avoided if trees are grown on their own roots from cuttings or by tissue culture, or if trees are budded on rootstocks such as Malling III.
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Professor Sprenger Crabapple

Keith Warren, J. Frank Schmidt & Son

Donald R. Selinger, Bailey Nurseries

Donald R. Selinger, Bailey Nurseries

Red Barron Crabapple

MI xx RB

Malus **'Red Barron'** Tree Form

Height:	18′ to 22′ (20′ at age 30)
Width:	15′ to 20′ (18′ at age 30)
Hardiness Zone:	4 to 8
Crown:	vase-shaped, medium texture
Foliage:	purple at emergence, then bronze-green, bronze to orange-red in fall
Flowers:	2″, dark rosy red to pink
Fruit:	1/2″, glossy deep red, persistent until spring
Description:	Originated in Massachusetts prior to 1955. Growth rate is moderate. Its form is narrowly columnar in youth, becoming broader and vase-shaped.
Advantages:	Moderately resistant to diseases, except scab. Has attractive flowers, foliage and fruit.
Limitations:	Severely susceptible to scab, but tolerant of the disease. Fireblight has occurred in places where climatic conditions are ideal for infection.
Site and Culture:	Species information applies. Specify tree form when ordering. Should be planted in full sun, preferably in well drained, acid soil. Adaptable to many soil types. Lower branches of street trees need to be pruned in the first few years for clearance of pedestrians and vehicles. Suckers from understock may need to be removed occasionally; suckers occur on budded plants, but may be avoided if trees are grown on their own roots from cuttings or by tissue culture, or if trees are budded on rootstocks such as Malling III.
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Red Barron Crabapple

Henry D. Gerhold, Penn State University

James W. Zampini, Lake County Nursery

James W. Zampini, Lake County Nursery

Red Jewel Crabapple

Ml xx RJ

Malus **'Jewelcole'** Tree Form
P.P. 3267, trademarked

Height: 14′ to 16′ (15′ at age 30)
Width: 10′ to 14′ (12′ at age 30)
Hardiness Zone: 4 to 8

Crown: broadly ovate, medium texture
Foliage: glossy dark green, yellow in fall
Flowers: white, single, abundant
Fruit: less than ½", cherry red, remains glossy into winter, persists into winter and is usually not eaten by birds

Description: A vigorous crabapple with horizontal branching, suited to street tree use. The habit is compact and rounded when young, becoming more spreading and irregular with age. It originated in Ohio and was introduced in 1972.

Advantages: Improved branch structure, attractive and persistent fruit, foliage usually clean. Good vigor, moderately resistant to fireblight, tolerant of scab, resistant to mites and pollutants.

Limitations: Slightly susceptible to mildew and fireblight.

Site and Culture: Species information applies. Specify tree form when ordering. Should be planted in full sun, preferably in well drained, acid soil. Adaptable to many soil types. Lower branches of street trees need to be pruned in the first few years for clearance of pedestrians and vehicles. Suckers from understock may need to be removed occasionally; suckers occur on budded plants, but may be avoided if trees are grown on their own roots from cuttings or by tissue culture, or if trees are budded on Malling III rootstocks.

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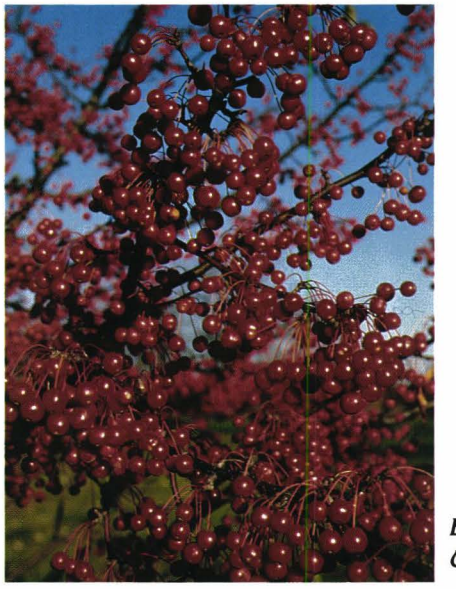
Red Jewel Crabapple

Edward R. Hasselkus, University of Wisconsin



Edward R. Hasselkus, University of Wisconsin

Keith Warren, J. Frank Schmidt & Son

Sentinel Crabapple

Ml xx Se

Malus **'Sentinel'** Tree Form

Height:	15′ to 18′ (16′ at age 30)
Width:	12′ to 15′ (13′ at age 30)
Hardiness Zone:	4 to 8
Crown:	columnar, becoming vase-shaped, medium texture
Foliage:	dark green
Flowers:	red buds, flowers white and pale pink
Fruit:	1/2″, red, persistent until spring

Description: Originated 1978 in Indiana. Growth rate is moderate. Its form is narrowly columnar in youth with upright branching, becoming broader and vase-shaped.

Advantages: Moderately resistant to diseases, but somewhat susceptible to scab. Has attractive flowers and fruit.

Limitations: Moderately susceptible to scab and Japanese beetles; slightly susceptible to fireblight, which can become severe under ideal conditions for infection.

Site and Culture: Species information applies. Specify tree form when ordering. Should be planted in full sun, preferably in well drained, acid soil. Adaptable to many soil types. Lower branches of street trees need to be pruned in the first few years for clearance of pedestrians and vehicles. Suckers from understock may need to be removed occasionally; suckers occur on budded plants, but may be avoided if trees are grown on their own roots from cuttings or by tissue culture, or if trees are budded on rootstocks such as Malling III.

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Sentinel Crabapple

Henry D. Gerhold, Penn State University

James W. Zampini,
Lake County Nursery

Henry D. Gerhold, Penn State University

Snowdrift

Ml xx Sn

Malus **'Snowdrift'** Tree Form

Height:	18′ to 22′ (20′ at age 30)
Width:	18′ to 22′ (20′ at age 30)
Hardiness Zone:	3 to 8
Crown:	broadly ovate, medium texture
Foliage:	glossy dark green, yellow in fall
Flowers:	profuse, large white blossoms emerge from pink buds, long flowering period
Fruit:	½″ or less, glossy orange-red, eaten by birds after being softened by frost
Description:	The vigorous, upright spreading growth produces a naturally well shaped tree. Introduced in 1965 in Ohio. An excellent street tree where space is adequate.
Advantages:	Requires little shaping or pruning. Improved in growth habit, flowers, fruit, and foliage. Tolerant of scab.
Limitations:	Moderately susceptible to fireblight.
Site and Culture:	Species information applies. Specify tree form when ordering. Should be planted in full sun, preferably in well drained, acid soil. Adaptable to many soil types. Lower branches of street trees need to be pruned in the first few years for clearance of pedestrians and vehicles. Suckers from understock may need to be removed occasionally; suckers occur on budded plants, but may be avoided if trees are grown on their own roots from cuttings or by tissue culture, or if trees are budded on Malling III rootstocks.
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Snowdrift Crabapple

William H. Collins, Plant Materials Consultant

T. Davis Sydnor, Ohio State University

William H. Collins, Plant Materials Consultant

Spring Snow Crabapple

MI xx SS

Malus **'Spring Snow'** Tree Form
P.P. 2667

Height: 25′ to 30′ (25′ at age 30)
Width: 20′ to 30′ (22′ at age 30)
Hardiness Zone: 3 to 8

Crown: ovate, medium texture
Foliage: bright green
Flowers: single, white, abundant, larger than average
Fruit: typically fruitless

Description: An upright, dense tree which maintains a good form. It was selected in Canada from seedlings of *M.* 'Dolgo', and introduced in 1966.

Advantages: The improved form requires little pruning. Fruitlessness is desirable in some street tree situations. Tolerant of scab.

Limitations: Susceptible to fireblight, and slightly to cedar-apple rust.

Site and Culture: Species information applies. Specify tree form when ordering. Should be planted in full sun, preferably in well drained, acid soil. Adaptable to many soil types. Lower branches of street trees need to be pruned in the first few years for clearance of pedestrians and vehicles. Suckers from understock may need to be removed occasionally; suckers occur on budded plants, but may be avoided if trees are grown on their own roots from cuttings or by tissue culture, or if trees are budded on Malling III rootstocks.

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Spring Snow Crabapple

Donald R. Selinger, Bailey Nurseries

Henry D. Gerhold,
Penn State University

Keith Warren, J. Frank Schmidt & Son

Sugar Tyme Crabapple

MI xx ST

Malus **'Sutyzam'** Tree Form
P.P. 7062

Height:	16′ to 20′ (18′ at age 30)
Width:	14′ to 16′ (15′ at age 30)
Hardiness Zone:	4 to 8
Crown:	broadly ovate, medium texture
Foliage:	green
Flowers:	abundant, fragrant white blossoms emerge from pale pink buds
Fruit:	½″ bright red fruit persists into winter
Description:	Upright when young, spreading with age. Good form for street tree use where space is adequate. Selected in Michigan and introduced in 1986.
Advantages:	Improved in growth habit, flowers, fruit, and disease resistance. Highly resistant to scab and fireblight.
Limitations:	None serious.
Site and Culture:	Species information applies. Specify tree form when ordering. Should be planted in full sun, preferably in well drained, acid soil. Adaptable to many soil types. Lower branches of street trees need to be pruned in the first few years for clearance of pedestrians and vehicles. Suckers from understock may need to be removed occasionally; suckers occur on budded plants, but may be avoided if trees are grown on their own roots from cuttings or by tissue culture, or if trees are budded on Malling III rootstocks.
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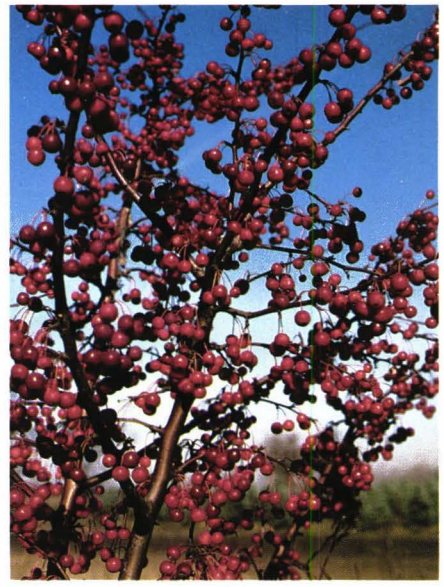
Sugar Tyme Crabapple

Keith Warren, J. Frank Schmidt & Son



Edward R. Hasselkus,
University of Wisconsin

Keith Warren, J. Frank Schmidt & Son

Redbud Crabapple

MI xz Ca

Malus x *zumi* **'Calocarpa'** Tree Form

Height:	20′ to 25′ (20′ at age 30)
Width:	25′ to 30′ (20′ at age 30)
Hardiness Zone:	4 to 8
Crown:	broadly globose, dense, medium texture
Foliage:	lustrous dark green
Flowers:	pinkish when emerging from red buds, then fading to white
Fruit:	½ ", abundant, glistening red to orange-red fruits persist into winter, but often are eaten by birds
Description:	A medium size, vigorous crab that is considered an improvement over variety *zumi,* and should not be confused with it. The crown is upright, spreading, and densely branched. It was introduced from Japan many years ago.
Advantages:	Improved in growth habit, foliage, flowers, fruit, and moderately resistant to fireblight, mildew and scab. Among the best crabapples for streets.
Limitations:	None serious. Somewhat susceptible to fireblight.
Site and Culture:	Species information applies. Specify tree form when ordering. Should be planted in full sun, preferably in well drained, acid soil. Adaptable to many soil types. Lower branches of street trees need to be pruned in the first few years for clearance of pedestrians and vehicles. Suckers from understock may need to be removed occasionally; suckers occur on budded plants, but may be avoided if trees are grown on their own roots from cuttings or by tissue culture, or if trees are budded on Malling III rootstocks.
Notes:	

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Redbud Crabapple

Donald R. Selinger, Bailey Nurseries

William Hendricks, Klyn Nurseries

Donald R. Selinger, Bailey Nurseries

Dawn Redwood

Mt gl

Metasequoia glyptostroboides

Height: 65′ to 85′ (60′ at age 30)
Width: 25′ to 40′ (25′ at age 30)
Hardiness Zone: 5 to 8

Crown: conical, fine fern-like texture
Foliage: deciduous, ½″ needles, yellow to orange-brown in fall
Flowers: inconspicuous
Fruit: 1″ pendulous cones

Description: Fossils from the age of dinosaurs were discovered in 1941, and in the same year living trees were found in China. Introduced in 1947, trees have grown well over a wide range of sites and at a rapid rate. The trunk is tapered with a buttressed base, and bark is reddish brown.

Advantages: This intriguing tree has been planted mainly as a specimen in lawns, but has also performed well in a few places where is has been tried as a street tree. Cleanup of fallen leaves has not been a problem. It is resistant to air pollution.

Limitations: Availability from nurseries has been limited. Growth is reduced on alkaline soils. A canker disease has been the only one reported. Mites may cause defoliation under drought stress.

Site and Culture: Transplants readily in the spring. Prefers full sun and acid soil. Limbing up in early years can reduce butt flare, and is recommended for street tree use.

Cultivars: 'National' has a narrow growth habit, but is more susceptible to canker than the species. 'Sheridan Spire' is narrow, upright, and compact.

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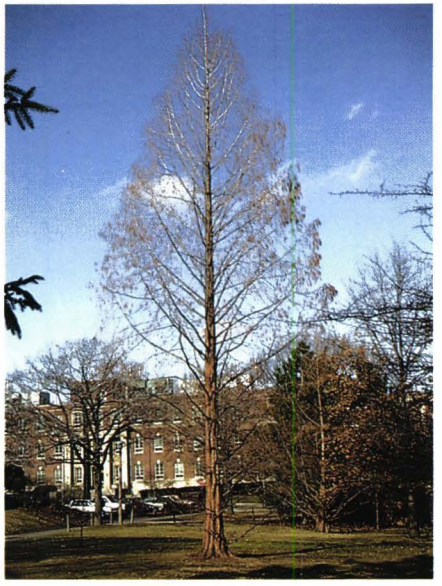
Dawn Redwood

Henry D. Gerhold, Penn State University



Henry D. Gerhold,
Penn State University

Henry D. Gerhold, Penn State University

Blackgum or Black Tupelo

Ny sy

Nyssa sylvatica

Height:	40′ to 70′ (35′ at age 30)
Width:	30′ to 45′ (25′ at age 30)
Hardiness Zone:	5 to 9
Crown:	conical changing to irregularly ovate, medium texture
Foliage:	2″ to 5″, glossy dark green; bright yellow, orange, and scarlet in fall
Flowers:	inconspicuous
Fruit:	1/2″ blue drupe, eaten by birds and mammals

Description: Scattered trees occur on moist sites in southern and eastern U.S. Typically the trunks are straight and the branches are horizontal. Bark is dark gray with rectangular fissures that give a blocky appearance. Growth is slow to medium on urban sites. Intolerant to shade.

Advantages: Distinctive growth habit and spectacular fall color make for a fine specimen tree. Useful as a street tree in residential areas. No serious damage from diseases or insects has been reported. Tolerates seacoast environments.

Limitations: Growth is depressed at pH above 6 and by compacted soil. Infrequently susceptible to several cankers and leaf spots, also a rust, leaf miner, and scale insect. Lower branches droop more with age. Fruit from older trees can stain sidewalks and can cause a litter problem.

Site and Culture: Transplanting is difficult, and must be done in spring using B&B stock. Prefers well drained, acid soil and full sun or light shade. Watering is suggested in the first year.

Cultivars: No cultivars are in production.

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Blackgum or Black Tupelo

Ralph C. Sievert, Cleveland City Forester

William Hendricks, Klyn Nurseries

William Hendricks, Klyn Nurseries

American Hophornbeam

Os vi

Ostrya virginiana Tree Form

Height:	30′ to 40′ (30′ at age 30)
Width:	20′ to 30′ (22′ at age 30)
Hardiness Zone:	4 to 8
Crown:	conical, becoming globose with age, medium-fine texture
Foliage:	2″ to 5″, green, yellow in the fall
Flowers:	catkins, male catkins visible in winter
Fruit:	nutlets hanging in hop-like bunches, greenish-white

Description: A graceful, small to medium size understory tree native to the eastern half of the United States, occurring on mesic upland sites and along streams. Attractive bark is gray brown and scaly on older trees. Fruit provides interesting contrast to the foliage. Growth rate is slow. The tree is sometimes grown in clump form.

Advantages: The species has performed well in urban plantings and narrow tree lawns. Seldom has pest problems. Tolerates shade, but also thrives in full sun.

Limitations: Does not tolerate severe urban stresses. Very sensitive to salt. Two-lined chestnut borer can destroy stressed trees. Few serious pest problems reported. Availability may be limited in some regions.

Site and Culture: Transplant B&B or container-grown plants in spring; recovers slowly. Prefers well drained, moist, slightly acid soil. Grows well in partial shade or full sun. Prune in winter or early spring.

Cultivars: No cultivars are commercially available. Genetic variation is likely because of its wide geographic range, so it would be prudent to obtain trees from a nursery near the planting site.

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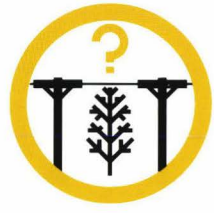

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American Hophornbeam

Henry D. Gerhold, Penn State University

Henry D. Gerhold,
Penn State University

Henry D. Gerhold, Penn State University

Macho Amur Corktree

Ph am Ma

Phellodendron amurense **'Macho'**
Trademarked

Height: 35′ to 45′ (40′ at age 30)
Width: 30′ to 40′ (35′ at age 30)
Hardiness Zone: 4 to 8

Crown: broadly ovate, moderately spreading, medium texture
Foliage: compound, 2½″ to 4½″ leaflets; glossy, thick, and leathery; yellow in the fall
Flowers: male, inconspicuous
Fruit: fruitless

Description: The species is native to northern China and Japan, and typically has low, spreading, massive branches. 'Macho', selected in Wisconsin and introduced in 1985, has more upright, uniform branching. Like the species, its bark is rugged and cork-like. The growth rate is medium.

Advantages: Thrives under city conditions, provided there is ample space for the spreading roots. The upright habit makes it suitable for spaces that are too limited for corktrees grown from seed. Being a male tree, it does not produce the fruit which is a litter problem and stains sidewalks. It is unusually pest free.

Limitations: The root system is shallow and spreading, requiring adequate space for good development.

Site and Culture: Recovers gradually after transplanting, so B&B stock planted in the spring is suggested. Tolerates acid or alkaline soils, wet soils, and drought. Evidence on good pollution tolerance is contradictory. Little maintenance is needed after pruning for clearance and to establish desired branch structure.

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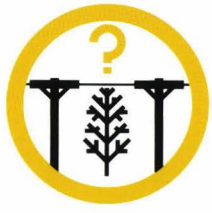

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Macho Amur Corktree

Edward R. Hasselkus, University of Wisconsin

Willet N. Wandell, Discov-Tree Research

Willet N. Wandell, Discov-Tree Research

Shademaster Amur Corktree

Ph am Sh

Phellodendron amurense **'PNI 4551'**
trademarked

Height: 35′ to 40′ (35′ at age 30)
Width: 35′ to 40′ (35′ at age 30)
Hardiness Zone: 3 to 7

Crown: broadly ovate, moderately spreading, medium texture
Foliage: compound, 2½″ to 4½″ leaflets, lustrous dark green, yellow in the fall
Flowers: male, inconspicuous
Fruit: fruitless

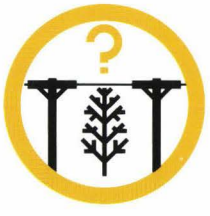
Description: The species is native to northern China and Japan, and typically has low, spreading, massive branches. 'Shademaster', selected in New Jersey and introduced in 1991, is a fruitless male clone that has an improved branching habit. Like the species, its bark is rugged and cork-like. The growth rate is medium.

Advantages: Withstands difficult planting sites, where there is ample space for the spreading roots. The improved branching habit makes it suitable for spaces that are too restrictive for broader corktrees grown from seed. As a male tree, it does not produce the fruit that can cause a litter problem and stain sidewalks. It is unusually pest free.

Limitations: The root system is shallow and spreading, requiring adequate space for good development. Availability is limited in some regions.

Site and Culture: Recovers gradually after transplanting, so B&B stock planted in the spring is suggested. Tolerates alkaline or acid soils, wet soils, and drought. Observations on pollution tolerance are contradictory. Little maintenance is needed after pruning for clearance and to establish desired branch structure.

Notes:



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Shademaster Amur Corktree

William Flemer III, Princeton Nurseries

Bloodgood London Planetree

Pl xa Bl

Platanus x *acerifolia* **'Bloodgood'**

Height: 70′ to 80′ (50′ at age 30)
Width: 55′ to 65′ (40′ at age 30)
Hardiness Zone: 5 to 9

Crown: broadly ovate, coarse texture
Foliage: 6″ to 9″, yellow-brown in fall
Flowers: inconspicuous
Fruit: usually two or three 1″ balls per stem, persist into winter

Description: The London plane is a cross between the eastern American sycamore and the Oriental plane that originated in England. The 'Bloodgood' cultivar was probably first propagated by rooted cuttings in Pennsylvania about 1900, before it had been named. It grows rapidly into a very large tree. The patchy olive-green, creamy gray, and brown bark is its most distinctive feature.

Advantages: A large, durable tree suited to city conditions where there is ample space. It tolerates compacted soils, drought, and seacoast environments. Resistance to anthracnose is high; some contrary reports involve uncertain identity of the cultivar.

Limitations: Bark, leaf, and fruit litter may be a nuisance. The hybrid is susceptible to serious and geographically pervasive damage by cankerstain disease; also to cankers, mildew, lacebugs, aphids, frost cracks, and winter injury. Despite ozone sensitivity in laboratory tests, pollution tolerance is quite good. Will heave sidewalks.

Site and Culture: Transplants readily, and is adaptable to a wide range of sites but needs a wide tree lawn. Plants propagated on their own roots are preferable.

Notes: Cultivars 'Columbia' and 'Liberty' developed at the National Arboretum are resistant to eastern strains of anthracnose, but not to western strains. 'Yarwood' is highly resistant to mildew, whereas 'Columbia' is susceptible.

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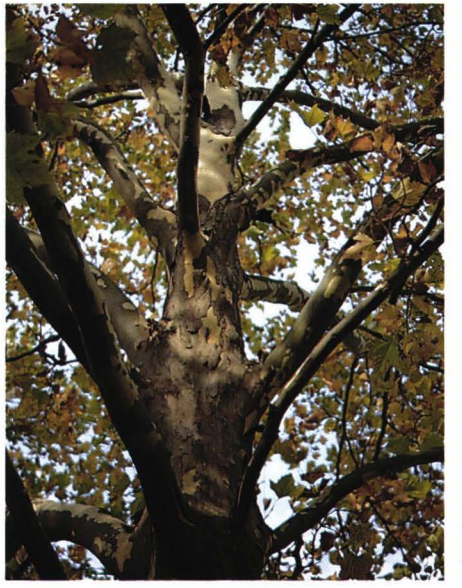
Bloodgood London Planetree

Henry D. Gerhold, Penn State University



Henry D. Gerhold,
Penn State University

Henry D. Gerhold,
Penn State University

Columnar Sargent Cherry

Pr sa Co

Prunus sargentii **'Columnaris'** Tree Form

Height:	30′ to 40′ (30′ at age 30)
Width:	12′ to 18′ (15′ at age 30)
Hardiness Zone:	4 to 8
Crown:	narrowly columnar, spreading with maturity, medium texture
Foliage:	3″ to 5″, glossy dark green, turning red-orange to gold early in the fall
Flowers:	deep rose, blooms early in spring
Fruit:	small black cherries, not showy
Description:	A slow growing species native to Japan and Korea, introduced in 1890. It is considered one of the best cherries for streetside use. The bark is a polished mahogany. Branching is upright.
Advantages:	A fine street tree for narrow spaces, it has attractive flowers, foliage, and bark. Requires little maintenance. It is the hardiest of the large Japanese cherries.
Limitations:	Branches of older trees are sometimes broken by storms. Pruning cuts heal slowly. Susceptible to occasional injuries by aphids, borers, scales, and defoliating insects. Longevity is limited to about twenty years.
Site and Culture:	Transplant in spring, recovers gradually. Prefers well drained acid soil and full sun.
Notes:	

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Columnar Sargent Cherry

William Flemer III, Princeton Nurseries

Henry D. Gerhold, Penn State University

William Hendricks, Klyn Nurseries

Amanogawa Oriental Cherry

Pr se Am

Prunus serrulata **'Amanogawa'** Tree Form

Height:	20′ to 25′ (20′ at age 30)
Width:	5′ to 7′ (5′ at age 30)
Hardiness Zone:	6 to 8
Crown:	narrow columnar, spreading somewhat with age, medium texture
Foliage:	yellowish green to green; lacks showy fall color
Flowers:	fragrant, pale pink, upright flower clusters
Fruit:	very few small black cherries

Description: The species is native to Japan, China, and Korea. 'Amanogawa' is an upright tree with ascending branching and gray bark. It was introduced many years ago, and is also known as 'Milky Way'.

Advantages: It has a picturesque form that can be used as an accent tree or in restricted spaces.

Limitations: The species is sensitive to pollution and stresses in general. It is susceptible to aphids, borers, scales, defoliating insects, and virus diseases. Mazzard cherry understock has been reported to be injured by cold. Useful life is limited to about 15 years.

Site and Culture: Transplant in spring. Prefers fertile, moist soils but is somewhat adaptable. Prune in late summer to avoid sap bleeding.

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Amanogawa Oriental Cherry

Keith Warren, J. Frank Schmidt & Son

Keith Warren,
J. Frank Schmidt & Son

Kwanzan Oriental Cherry

Pr se Kw

Prunus serrulata **'Sekiyama'** Tree Form

Height: 25′ to 35′ (30′ at age 30)
Width: 20′ to 25′ (20′ at age 30)
Hardiness Zone: 5 to 8

Crown: moderately vase-shaped, spreading with age, medium texture
Foliage: emerges reddish copper, turning dark green; orange-brown in fall
Flowers: 2½″ pendulous, double, deep pink blossoms
Fruit: fruitless

Description: The species is native to Japan, China, and Korea. 'Kwanzan' is the most popular cultivar, made famous by the Washington D.C. cherry blossom displays. It is also known as 'Sekiyama'. The most commonly used form is budded on a standard at 4′ to 6′ to establish a suitable crown height.

Advantages: Valued chiefly for its beautiful floral display and vase-shaped growing habit. Tolerates drought and seacoast environments.

Limitations: The species is sensitive to pollution and stresses in general. It is susceptible to aphids, borers, scales, defoliating insects, and virus diseases. Useful life is limited to about 25 years, less on Mazzard understock.

Site and Culture: Transplant in spring. Prefers fertile, moist soils but is somewhat adaptable. Avoid Mazzard understock. Plants propagated on their own roots are preferable.

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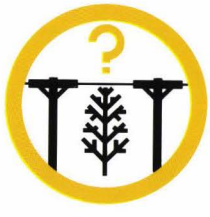

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Kwanzan Oriental Cherry

William Hendricks, Klyn Nurseries

William Flemer III, Princeton Nurseries

William Flemer III, Princeton Nurseries

Shubert Chokecherry or Canada Red Cherry

Pr vi Sh

Prunus virginiana **'Shubert'** Tree Form

Height:	20′ to 30′ (25′ at age 30)
Width:	15′ to 20′ (18′ at age 30)
Hardiness Zone:	3 to 8
Crown:	ovate, medium texture
Foliage:	2″ to 5″ leaves emerge green, mature to a deep reddish purple
Flowers:	white 3″ to 6″ clusters
Fruit:	dark purple to black
Description:	The species has a transcontinental range across North America. 'Shubert', introduced in 1954, is a hardy, vigorous tree that is colorful throughout the season. The foliage is dense and branching is upright.
Advantages:	Colorful foliage, flowers, and fruit, combined with vigorous upright growth, make this tree attractive, especially for confined spaces. It is extremely hardy.
Limitations:	Susceptible to various insects and black knot. Suckering occurs near the ground, which can be a serious maintenance problem. Service life is limited to about 10 to 20 years.
Site and Culture:	Transplant in spring. Tolerates low fertility soils and dry sites.
Notes:	'Canada Red Select' is improved in faster growth and denser, more regular branching habit.

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Shubert Chokecherry or Canada Red Cherry

Edward R. Hasselkus, University of Wisconsin

Henry D. Gerhold,
Penn State University

Donald R. Selinger, Bailey Nurseries

Accolade Flowering Cherry

Pr xx Ac

Prunus **'Accolade'**

Height:	30′ to 40′ (30′ at age 30)
Width:	25′ to 35′ (25′ at age 30)
Hardiness Zone:	5 to 8
Crown:	globose, open and spreading, medium texture
Foliage:	2″ to 4″, green
Flowers:	double, rosy-pink flowers in profuse, pendulous clusters
Fruit:	none
Description:	A hybrid of *P. sargentii* x *P. subhirtella* introduced 1930 in England. Grows vigorously and has a strong trunk, suitable as a street tree or ornamental.
Advantages:	Especially attractive during the spring flowering period.
Limitations:	Flowering cherries are usually short-lived, and have many pest problems. *P. subhirtella* is reputed to be more stress tolerant than other cherries. No specific information about limitations was found. Availability may be limited in some regions.
Site and Culture:	Transplant in the spring. Prefers well drained, acid soil and full sun. Do not over-water.
Notes:	

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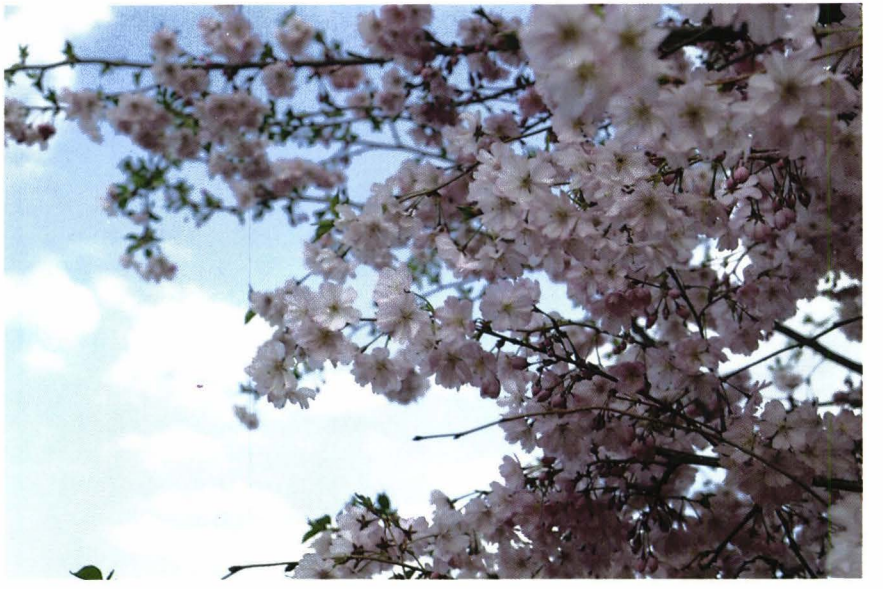
Accolade Flowering Cherry

Henry D. Gerhold, Penn State University



Henry D. Gerhold, Penn State University

Dancer Ornamental Birchleaf Pear

Py be Dn

Pyrus betulifolia **'Southworth'**
Trademarked

Height: 30′ to 35′ (30′ at age 30)
Width: 20′ to 25′ (20′ at age 30)
Hardiness Zone: 4 to 8

Crown: moderately ovate, medium-fine texture
Foliage: silver-gray at emergence, leaves with 2″ petioles, become shiny light green
Flowers: abundant white flowers, larger than those of Callery pears and opening three weeks later
Fruit: ⅓″, brown, persistent

Description: The species occurs in northern China, a slender, graceful, small tree that grows rapidly. The 'Dancer' was introduced in 1987 from Illinois, so its characteristics in other locales are not yet well known. Leaves with long, flexible petioles dance in the wind.

Advantages: The small size, shimmering foliage, and abundant, reliable blooms suggest that this tree is worth trying widely in restricted urban settings. No fireblight has been observed during early trials in Illinois.

Limitations: Little is known about its mature characteristics, or susceptibility to diseases or insects. The species may be susceptible to fireblight. May be very difficult to find.

Site and Culture: Transplants readily with early recovery. In general, pears are tolerant of various soils, drought, and pollution. Trees should be planted in the spring. Trees budded on common pear understock should not be used.

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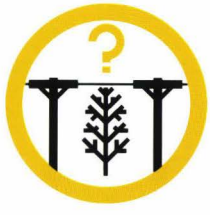

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Dancer Ornamental Birchleaf Pear

Henry D. Gerhold, Penn State University

Willet N. Wandell,
Discov-Tree Research

Callery Pear

Py ca

Pyrus calleryana

Height: 30′ to 50′ (40′ at age 30)
Width: 20′ to 35′ (30′ at age 30)
Hardiness Zone: 5 to 8

Crown: conical to broadly ovate, medium texture
Foliage: 2″ to 3″, glossy green; yellow, bronze, or red in fall
Flowers: white, abundant, malodorous
Fruit: ½″ pome, sometimes abundant but hidden in foliage

Description: This Chinese species was first introduced for use in breeding or as an understock for fruit production. USDA scientists recognized its ornamental value, and released 'Bradford' as the first of many landscape cultivars that were to follow. The tree occurs on slopes and in swamps in a mild region of China.

Advantages: Valued for its attractive foliage and flowers, tolerance of city conditions, and medium size. Some cultivars have been planted extensively.

Limitations: On older trees large branches may split from the trunk at weak crotches. Fireblight susceptibility is quite variable among trees grown from seed, and can be severe. Cankers have been reported, but no serious disease or insect problems. Trees grown from seed have thorns and excessive fruit.

Site and Culture: Transplant B&B in spring. Adaptable to many soils, and tolerant of pollution and drought. For certain cultivars pruning has been suggested to thin out the scaffold branches and reduce branch length. Pruning should begin when trees are young and continue until a strong scaffold for the mature size has been established. Planting two or more cultivars together may increase fruit set.

Cultivars: Many cultivars have been selected for thornlessness and to improve upon 'Bradford' in branching habit and cold hardiness. Some are more resistant to fireblight than others.

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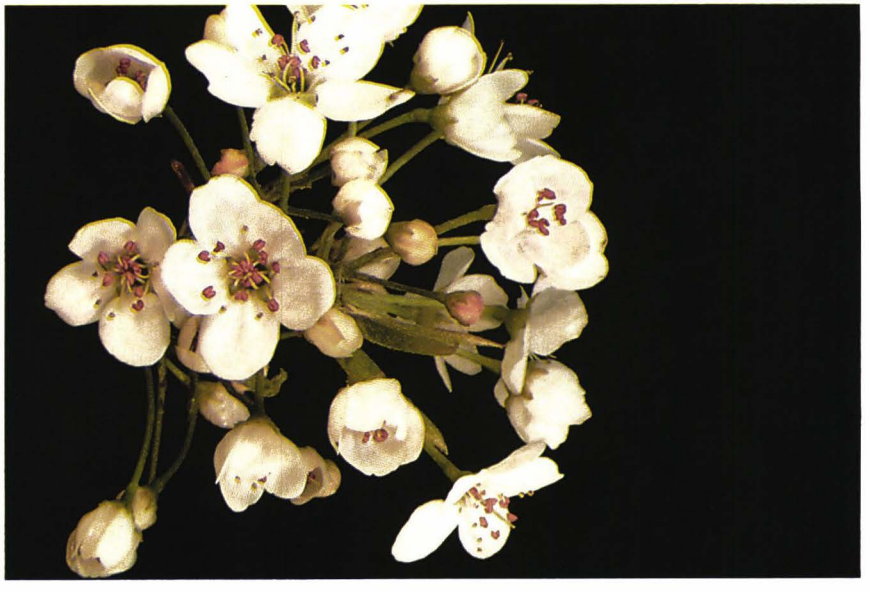
Callery Pear

Ohio State University

Ohio State University



Ohio State University

Aristocrat Callery Pear

Py ca Ar

Pyrus calleryana **'Aristocrat'**
P.P. 3193

Height: 35′ to 45′ (40′ at age 30)
Width: 25′ to 35′ (30′ at age 30)
Hardiness Zone: 5 to 9

Crown: broadly conical, medium texture
Foliage: leaves glossier than 'Bradford' with wavy margin and a red blush
Flowers: white, less abundant on young plants, malodorous
Fruit: pea-sized, russet, often abundant

Description: Selected in Kentucky and introduced in 1972. It has horizontal to upright branching and young trees have a better, more open structure than 'Bradford'. Its growth rate is fast, and it is thornless.

Advantages: The superior branch structure should make it less subject to wind breakage, and may require less pruning.

Limitations: Susceptible to fireblight, particularly in southeastern U.S. Branching habit in older trees is rather irregular.

Site and Culture: Species information applies. Transplant B&B in spring. Adaptable to many soils, and tolerant of pollution and drought. Pruning should begin when trees are young and continue until a strong scaffold for the mature size has been established. Planting two or more cultivars together may increase fruit set.

Notes:

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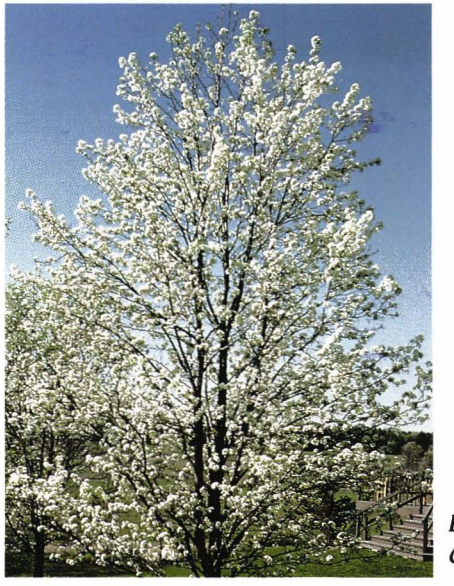
Aristocrat Callery Pear

William H. Collins, Plant Materials Consultant



Edward R. Hasselkus,
University of Wisconsin

Keith Warren, J. Frank Schmidt & Son

Autumn Blaze Callery Pear

Py ca AB

Pyrus calleryana **'Autumn Blaze'**
P.P. 4591.

Height: 35′ to 45′ (40′ at age 30)
Width: 25′ to 35′ (25′ at age 30)
Hardiness Zone: 5 to 8

Crown: ovate, medium texture
Foliage: leaves glossy green, turning crimson and red-orange earlier in the fall
Flowers: pinkish blossoms fade to white
Fruit: pea-sized, russet, persistent

Description: Selected in Oregon and introduced in 1980. The growth habit is open and somewhat irregular. The branches are at right angles to the trunk, and it has some thorns. It goes into dormancy earlier than most other cultivars.

Advantages: The superior branch structure should make it less subject to wind breakage, and may require less pruning. Fall color is better than some other cultivars. Hardier in northern zones than other cultivars.

Limitations: Susceptible to fireblight. It has some thorns.

Site and Culture: Species information applies. Transplant B&B in spring. Adaptable to many soils, and tolerant of pollution and drought. Pruning should begin when trees are young and continue until a strong scaffold for the mature size has been established. Planting two or more cultivars together may increase fruit set.

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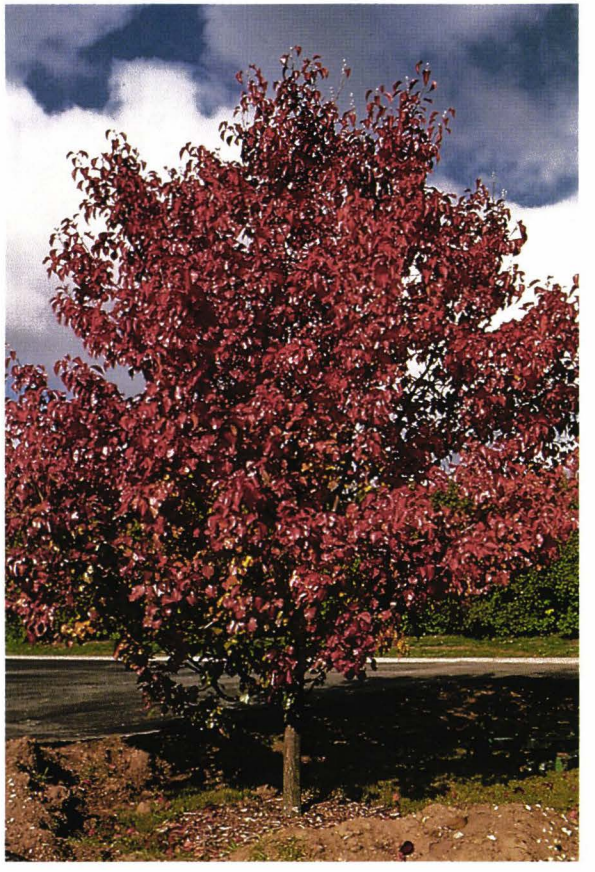
Autumn Blaze Callery Pear

Donald R. Selinger, Bailey Nurseries



Edward R. Hasselkus,
University of Wisconsin

Bradford Callery Pear

Py ca Br

Pyrus calleryana **'Bradford'**

Height:	40′ to 50′ (40′ at age 30)
Width:	35′ to 45′ (35′ at age 30)
Hardiness Zone:	5 to 9
Crown:	broadly ovate, medium texture
Foliage:	leaves glossy green, turning mahogany and yellow in the fall
Flowers:	same as species — white, abundant, malodorous
Fruit:	pea-sized, russet, persistent

Description: Selected in Maryland from seedlings of Chinese origin and introduced in 1963. It was the first named cultivar of the species and has demonstrated the excellent potential for landscape use.

Advantages: Though still very popular for its tolerance of urban conditions and attractive appearance, 'Bradford' has an inferior branching habit compared to other cultivars.

Limitations: An overly dense, long branching habit makes older trees susceptible to wind breakage, which can be modified by pruning. Dense crown sometimes attracts roosting birds. Slight susceptibility to fireblight is usually restricted to branch tips. Some graft incompatibility problems have been reported. Holds leaves late, which may result in snow storm damage.

Site and Culture: Species information applies. Transplant B&B in spring. Adaptable to many soils, and tolerant of pollution and drought. Pruning has been suggested to thin out the scaffold branches and reduce branch length. Pruning should begin when trees are young and continue until a strong scaffold for the mature size has been established. Planting two or more cultivars together may increase fruit set.

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Bradford Callery Pear

Henry D. Gerhold, Penn State University

Henry D. Gerhold,
Penn State University

Edward R. Hasselkus, University of Wisconsin

Capital Callery Pear

Py ca Ca

Pyrus calleryana **'Capital'**

Height: 35′ to 45′ (35′ at age 30)
Width: 12′ to 16′ (14′ at age 30)
Hardiness Zone: 5 to 8

Crown: narrowly columnar, compact, medium texture
Foliage: glossy green leaves, reddish purple in the fall
Flowers: same as species—white, abundant, malodorous
Fruit: small, russet, abundant, eaten by birds after they soften

Description: Selected in Maryland from seedlings of 'Bradford' and introduced in 1981. It is the most narrow of all callery pears, and has a compact crown when young. Branches curve upward parallel to the strong central leader.

Advantages: Especially suited to narrow spaces. Susceptibility to fireblight has been reported, though in the Southeast the disease incidence has been comparatively low. In several southern states 'Capital' was found to be resistant to natural infection or after inoculation.

Limitations: Compact form becomes more open on older trees. Branches may break out like those of 'Bradford'. Slightly susceptible to fireblight.

Site and Culture: Species information applies. Transplant B&B in spring. Adaptable to many soils, and tolerant of pollution and drought. Pruning should begin when trees are young and continue until a strong scaffold for the mature size has been established. Planting two or more cultivars together may increase fruit set.

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Capital Callery Pear

William Flemer III, Princeton Nurseries

Henry D. Gerhold,
Penn State University

Chanticleer Callery Pear or Cleveland Select Callery Pear

Py ca Ch

Pyrus calleryana **'Chanticleer'**
P.P. 2489

Height:	35′ to 40′ (37′ at age 30)
Width:	15′ to 20′ (15′ at age 30)
Hardiness Zone:	5 to 8
Crown:	narrowly conical, medium texture
Foliage:	leaves glossy green, turning brilliant gold-red to plum in the fall, earlier than 'Bradford' by about three weeks
Flowers:	same as species — white, abundant, malodorous
Fruit:	½ ", dull gold to russet, persistent
Description:	The original tree was selected in Ohio and introduced in 1965. Its conical form, maintained through maturity, has a tailored appearance.
Advantages:	Especially suitable where space to spread is limited. It enters dormancy earlier than 'Bradford', and is resistant to fireblight. It is thornless, and much less susceptible to wind breakage.
Limitations:	None reported.
Site and Culture:	Species information applies. Transplant B&B in spring. Adaptable to many soils, and tolerant of pollution and drought. Pruning should begin when trees are young and continue until a strong scaffold for the mature size has been established. Planting two or more cultivars together may increase fruit set.
Notes:	**'Chanticleer', 'Cleveland Select',** and **'Stone Hill'** have the same characteristics, and are believed to be names of a single clone.

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Chanticleer Callery Pear or Cleveland Select Callery Pear

William Hendricks, Klyn Nurseries

Keith Warren,
J. Frank Schmidt & Son

Redspire Callery Pear

Py ca Rd

Pyrus calleryana **'Redspire'**
P.P. 3815

Height: 40′ to 45′ (40′ at age 30)
Width: 20′ to 25′ (22′ at age 30)
Hardiness Zone: 5 to 8

Crown: narrowly ovate when young, medium texture
Foliage: leaves glossier than 'Bradford', turning yellow, crimson, and purple in the fall
Flowers: larger blossoms and clusters than 'Bradford'
Fruit: same as species —½" pome, sometimes abundant but hidden in foliage

Description: Selected in New Jersey as a seedling of 'Bradford', and introduced in 1975. In addition to the narrower crown and larger flowers, it ceases growth earlier in the fall and thus escapes damage from early frosts.

Advantages: Improvements include a better branch structure that can reduce wind damage and requires less pruning. Moderate resistance to fireblight has been reported.

Limitations: Lacks fall color in the north.

Site and Culture: Species information applies. Transplant B&B in spring. Adaptable to many soils, and tolerant of pollution and drought. Pruning should begin when trees are young and continue until a strong scaffold for the mature size has been established. Planting two or more cultivars together may increase fruit set.

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Redspire Callery Pear

William Flemer III, Princeton Nurseries

Henry D. Gerhold,
Penn State University

William Flemer III, Princeton Nurseries

Whitehouse Callery Pear

Py ca Wh

Pyrus calleryana **'Whitehouse'**

Height:	30′ to 40′ (30′ at age 30)
Width:	15′ to 20′ (18′ at age 30)
Hardiness Zone:	5 to 8
Crown:	narrowly conical to ovate, medium texture
Foliage:	green leaves, turning reddish purple early in the fall
Flowers:	same as species—white, abundant, malodorous
Fruit:	small, russet, abundant

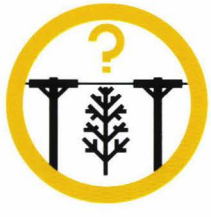
Description: Selected in Maryland from seedlings of Bradford and introduced in 1977. Its growth habit is moderately narrow with ascending branches.

Advantages: Suitable where space is somewhat restricted. Susceptibility to fireblight has been reported, though in the Southeast the disease incidence has been comparatively low. In several southern states 'Whitehouse' was found to be resistant to natural infection or after inoculation.

Limitations: Form becomes more open on older trees. Branches may break out like those of 'Bradford'. Susceptible to leafspot, which can disfigure leaves severely. Slightly susceptible to fireblight.

Site and Culture: Species information applies. Transplant B&B in the spring. Adaptable to many soils, and tolerant of pollution and drought. Pruning should begin when trees are young and continue until a strong scaffold for the mature size has been established. Planting two or more cultivars together may increase fruit set.

Notes:



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Whitehouse Callery Pear

Keith Warren, J. Frank Schmidt & Son

Henry D. Gerhold,
Penn State University

Sawtooth Oak

Qu ac

Quercus acutissima

Height:	40′ to 50′ (40′ at age 30)
Width:	35′ to 55′ (45′ at age 30)
Hardiness Zone:	5 to 9
Crown:	broadly conical when young, becoming broadly ovate to globose, medium-coarse texture
Foliage:	3½′′ to 7½′′, resembling chestnut leaves, lustrous green, little fall color
Flowers:	slender golden male catkins
Fruit:	1′′ acorn, often heavy crops, consumed by wildlife
Description:	Native to China, Japan, and Korea, the species is variable in growth habit. Trees tend to be conical and dense when young, and later become broader with wide-spreading branches, sometimes broader then tall. Leaves are bright golden yellow upon opening. The bark becomes deeply ridged and almost corky on old trees. Growth rate is medium.
Advantages:	Suited to smaller spaces than most other oaks. Tolerates city conditions. Attractive, clean foliage. Seldom has disease or insect problems.
Limitations:	Requires adequate space for wide branching. Chlorosis may develop at high pH. Acorns from older trees can cause a litter problem in some years. Trees in the marketplace are variable in growth habit and hardiness.
Site and Culture:	Transplants readily as B&B stock; recovers slowly. Adaptable to a range of sites, preferring acid, well drained soils and full sun. Tolerates heat and somewhat dry or wet soils.
Cultivars:	'Gobbler' is the name given to seedlings of a tree of unknown origin selected for prolific fruiting, and suitable for wild turkey food. No street tree cultivars are commercially available.
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Sawtooth Oak

Henry D. Gerhold, Penn State University

Henry D. Gerhold,
Penn State University

Henry D. Gerhold,
Penn State University

Swamp White Oak

Qu bi

Quercus bicolor

Height:	60′ to 80′ (30′ at age 30)
Width:	50′ to 80′ (25′ at age 30)
Hardiness Zone:	4 to 7
Crown:	broadly ovate to globose, medium texture
Foliage:	4″ to 8″, rounded lobes, green above, lighter below, yellow-brown in fall
Flowers:	inconspicuous
Fruit:	1″ acorns, usually in pairs, heavy crops at 3 to 5 year intervals

Description: The species is native to moist or swampy sites in central U.S. extending to southern New England. A broad, open crown above a short trunk has descending lower branches. The gray-brown bark sheds in ragged flakes from young trees, and is deeply furrowed when mature. Shade tolerance is intermediate and growth rate is moderate after a slow start.

Advantages: Tolerates drought, salt, and soil compaction in urban environments. It is transplanted more readily than other white oaks.

Limitations: Severe chlorosis occurs on alkaline soils. Infrequently susceptible to oak wilt, anthracnose, cankers, gypsy moth, and borers. Acorns can be a litter problem in some years.

Site and Culture: Transplant B&B in the spring. Requires ample space and acid soil; tolerates imperfect drainage after establishment.

Cultivars: None known.

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Swamp White Oak

Robert Skiera, Milwaukee City Forester

Henry D. Gerhold,
Penn State University

Donald R. Selinger, Bailey Nurseries

Shingle Oak

Qu im

Quercus imbricaria

Height:	40′ to 65′ (35′ at age 30)
Width:	40′ to 70′ (35′ at age 30)
Hardiness Zone:	4 to 7
Crown:	conical in youth becoming broadly globose, medium texture
Foliage:	3″ to 6″, laurel-like leaves, shiny dark green, yellow-brown to russet-red in fall
Flowers:	yellow catkins
Fruit:	5/8″ acorn, moderate crops at 2 to 4 year intervals

Description: The native range in east-central United States extends from Pennsylvania to Nebraska and south to Arkansas and Georgia. The species has performed well as a street tree in the Midwest on sites that have adequate space. Growth rate is slow to medium. Lower branches of older trees tend to droop. Leaves of young trees commonly persist through the winter.

Advantages: Attractive leaves. Tolerates city conditions.

Limitations: Twig galls and leaf miner are common. Other diseases and insects of oaks are infrequent. Acorns cause less of a litter problem than with most other oaks.

Site and Culture: Transplants fairly well, preferably B&B in spring. Plant in full sun. Tolerates dry soils and city conditions, but prefers well-drained, moist, acid soils.

Cultivars: None known.

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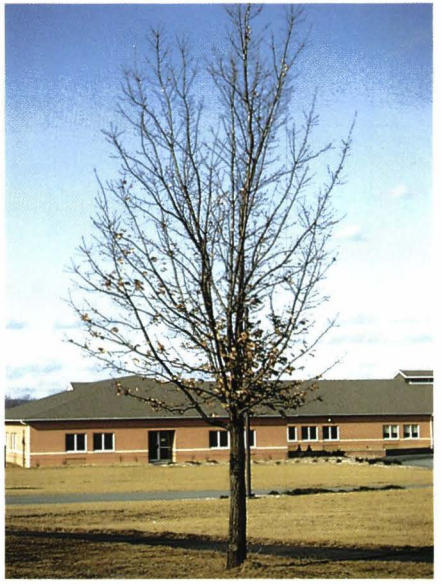
Shingle Oak

Henry D. Gerhold, Penn State University



Henry D. Gerhold,
Penn State University

Henry D. Gerhold, Penn State University

Bur Oak

Qu ma

Quercus macrocarpa

Height:	70′ to 90′ (35′ at age 30)
Width:	60′ to 90′ (25′ at age 30)
Hardiness Zone:	3 to 8
Crown:	ovate becoming broadly globose with age, coarse texture
Foliage:	5″ to 8″, fiddle-shaped with rounded lobes, glossy green with pale underside, yellow- brown in fall
Flowers:	inconspicuous
Fruit:	1″ acorn in a fringed cup, heavy crops at 3 to 5 year intervals.
Description:	A massive tree with stout branching when mature, it occurs on alkaline soils in the central U.S. and the Great Plains region, and in portions of Canada and northeastern states. The dark gray bark becomes rough and deeply furrowed with age. This member of the white oak group grows slowly and is intolerant of shade.
Advantages:	A durable tree that tolerates urban stresses and a wide range of soils, from moist to dry and acid to alkaline. Its massive stature is appropriate for spacious grounds.
Limitations:	Transplant shock may last several years, and growth rate remains slow even after establishment. Diseases and insects seldom cause serious problems, but it is susceptible to oak wilt, anthracnose, cankers, gypsy moth, and borers. Acorns can be a litter problem in some years.
Site and Culture:	Transplant B&B in the spring where there is ample space and full sun.
Cultivars:	None available.
Notes:	

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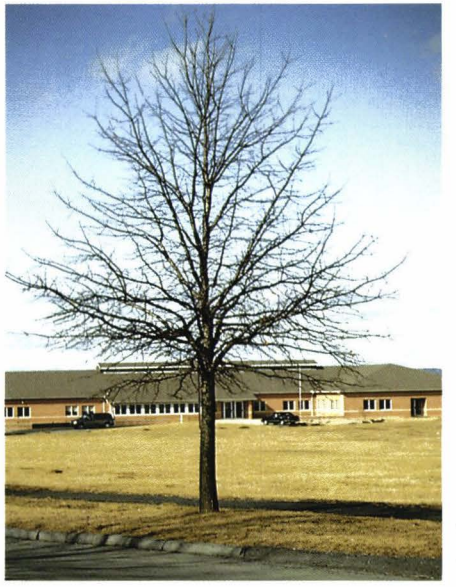
Bur Oak

Henry D. Gerhold, Penn State University



Henry D. Gerhold,
Penn State University

Henry D. Gerhold,
Penn State University

Pin Oak

Qu pa

Quercus palustris

Height: 55′ to 75′ (50′ at age 30)
Width: 40′ to 55′ (35′ at age 30)
Hardiness Zone: 5 to 8

Crown: conical becoming ovate, medium texture
Foliage: 3″ to 6″, lobes narrow and pointed, glossy green, bronze or red in fall
Flowers: inconspicuous
Fruit: ½″ acorns, crops occur at 1 to 2 year intervals.

Description: The shape and growth habit are different from most other oaks. It has a dominant central leader and numerous branches; upper ones are upright, and lower branches are descending. It occurs naturally on moist or wet sites in central and eastern U.S. The smooth, dark gray bark becomes fissured with age. Leaves of young trees commonly persist through the winter. Growth rate is medium to fast, and it is intolerant of shade.

Advantages: The distinctive growth habit makes it one of the most popular oaks for landscaping where space is adequate, including some broad streets and a wide range of soils, from moist to dry. Its massive stature is appropriate for spacious grounds.

Limitations: Chlorosis can become very severe on alkaline or limestone soils; the onset is sometimes delayed, but it can stunt and kill trees eventually. It is infrequently injured by gypsy moth, oak wilt, galls, or cankers. Acorns can be a litter problem in some years.

Site and Culture: Transplants readily. Requires acid soil free of limestone, and full sun. Chlorosis can be corrected with ferric ammonium citrate capsules. Descending lower branches must be pruned very high where clearance is needed for pedestrians or traffic.

Cultivars: 'Crownright' and 'Sovereign', both of which have upright lower branches, were taken out of production because of delayed graft incompatibility problems.

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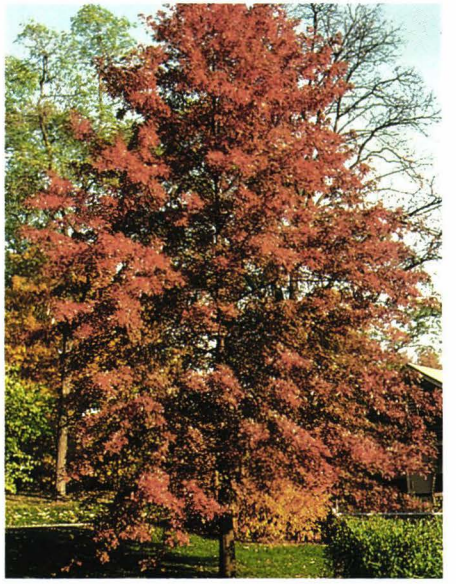
Pin Oak

Henry D. Gerhold, Penn State University



Edward R. Hasselkus,
University of Wisconsin

Henry D. Gerhold,
Penn State University

Willow Oak

Qu ph

Quercus phellos

Height: 55′ to 75′ (40′ at age 30)
Width: 45′ to 60′ (30′ at age 30)
Hardiness Zone: 6 to 9

Crown: conical changing to dense ovate, medium-fine texture
Foliage: 2″ to 5″, glossy willow-like leaves, yellow-brown to russet red in fall
Flowers: inconspicuous
Fruit: ½″ acorns, frequent crops

Description: A bottomland species of southern U.S., its range extends into Pennsylvania and New Jersey. The growth habit resembles pin oak, except lower branches are not as descending. It has fast growth and is moderately intolerant of shade.

Advantages: Widely planted as a street tree in the South. It can be transplanted more successfully than most oaks, and becomes established quickly. With proper planting it tolerates wet sites.

Limitations: Reported to be slower growing at northern locations. Susceptible to trunk borers, scale insects, and oak wilt. Chlorosis develops if pH is too high. More difficult to prune than red oak because of density and twiginess. Acorns can be a litter problem in some years.

Site and Culture: Prefers acid soil and full sun. Specify a northern seed source for northern zones. Transplant B&B in the spring.

Cultivars: None

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Willow Oak

Henry D. Gerhold, Penn State University

Henry D. Gerhold,
Penn State University

English Oak

Qu ro

Quercus robur

Height:	60′ to 80′ (40′ at age 30)
Width:	50′ to 70′ (35′ at age 30)
Hardiness Zone:	5 to 8
Crown:	broadly ovate to globose, also columnar cultivars, medium texture
Foliage:	3″ to 5″, lobes rounded, dark green with pale underside, brown in fall
Flowers:	inconspicuous
Fruit:	1″ to 2″ acorns on stalks, heavy crops at 2 to 4 year intervals.

Description: The species is native to Europe, western Asia, and northern Africa. It is a stalwart tree that has long been cultivated. The trunk tends to be short with furrowed dark gray bark, and the crown is broad and open. Growth rate is slow to moderate, and it is moderately intolerant of shade.

Advantages: Tolerates drought, pollution, restricted root space, and a wide range of pH.

Limitations: Growth is slow for several years after transplanting. Mildew on leaves is often a serious problem. It is infrequently injured by oak wilt, anthracnose, cankers, gypsy moth, and borers. Acorns can be a litter problem in some years.

Site and Culture: Transplants readily B&B in the spring. Plant in full sun, in well-drained acid to slightly alkaline soil.

Cultivars: Several cultivars have been developed with narrow form and ascending branches. Other cultivars selected for purplish or yellowish color, cut-leaf foliage, or weeping habit are rarely available.

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English Oak

Henry D. Gerhold, Penn State University

Henry D. Gerhold, Penn State University

T. Davis Sydnor, Ohio State University

Attention! English Oak

Qu ro At

Quercus robur **'DTR 105'**
P.P. 6746

Height:	50′ to 60′ (45′ at age 30)
Width:	14′ to 17′ (15′ at age 30)
Hardiness Zone:	4 to 8
Crown:	Narrowly conical to columnar, dense, medium texture
Foliage:	dark green, bronze in the fall
Flowers:	catkins
Fruit:	1′′ acorn

Description: Introduced 1988 in Illinois, it is a selection from *Q. robur* 'Fastigiata' which retains a tighter branching habit and has smaller, thick, blue-green leaves.

Advantages: The tight growth form is reliable, and suited to restricted spaces or architectural effects that are formal or give emphasis. Foliage is resistant to mildew. Like the species, it tolerates drought, pollution, restricted root space, and a wide range of pH.

Limitations: Availability is limited. No serious diseases or insects have been reported. Golden oak scale can be fatal, but occurs infrequently.

Site and Culture: Transplants readily B&B in the spring, or can be planted bare root with extra care. Plant in full sun, in well-drained acid to slightly alkaline soil.

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Attention! English Oak

Donald R. Selinger, Bailey Nurseries

Henry D. Gerhold,
Penn State University

Fastigiate English Oak

Qu ro Fa

Quercus robur **'Fastigiata'**

Height: 50′ to 60′ (45′ at age 30)
Width: 15′ to 20′ (15′ at age 30)
Hardiness Zone: 5 to 8

Crown: narrowly conical to columnar, dense, medium texture
Foliage: dark green, bronze in the fall
Flowers: catkins
Fruit: 1′′ acorn

Description: *Q. robur* 'Fastigiata', resembling the Lombardy poplar in outline, has long been in cultivation. Many of the trees are grown from seed, as the fastigiate habit is inherited, though somewhat variably. It has smaller leaves than the species.

Advantages: The narrow form is suited to restricted spaces or architectural effects that are formal or give emphasis. Like the species, it tolerates drought, pollution, restricted root space, and a wide range of pH.

Limitations: The form is somewhat variable, and branches increasingly tend to bend out as trees age. Mildew can be severe sometimes, but is just a cosmetic problem. Golden oak scale can be fatal, but occurs infrequently. No other serious diseases or insects have been reported. Several other cultivars are superior in crown form and mildew resistance.

Site and Culture: Transplants readily B&B in the spring, or can be planted bare root with extra care. Plant in full sun, in well-drained acid to slightly alkaline soil.

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Fastigiate English Oak

Henry D. Gerhold, Penn State University

Donald R. Selinger,
Bailey Nurseries

Henry D. Gerhold,
Penn State University

Skymaster English Oak

Qu ro Sm

Quercus robur **'Pyramich'**
P.P. 3707, trademarked

Height: 50′ to 60′ (50′ at age 30)
Width: 25′ to 30′ (25′ at age 30)
Hardiness Zone: 4 to 8

Crown: Conical to narrowly ovate, medium texture dark green
Foliage: dark green
Flowers: catkins
Fruit: 1″ acorn

Description: It was selected in Michigan for its strong leader, wider branch angles, and wider form than *Q. robur* 'Fastigiata', and introducted in 1986. Growth rate is rapid.

Advantages: The uniform shape and strong, upright branching habit are an advantage over ordinary *Q. robur.* Like the species, it tolerates drought, pollution, restricted root space, and a wide range of pH. Shows some resistance to mildew.

Limitations: Availability is limited. Golden oak scale can be fatal, but occurs infrequently. No other serious diseases or insects have been reported.

Site and Culture: Transplants readily B&B in the spring, or can be planted bare root with extra care. Plant in full sun, in well-drained acid to slightly alkaline soil.

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Skymaster English Oak

Henry D. Gerhold, Penn State University

Skyrocket English Oak

Qu ro Sr

Quercus robur **Skyrocket**
trademarked

Height: 45′ to 60′ (45′ at age 30)
Width: 14′ to 17′ (15′ at age 30)
Hardiness Zone: 5 to 8

Crown: Narrowly conical to columnar, dense, medium texture
Foliage: dark green, yellow-brown in the fall
Flowers: catkins
Fruit: 1″ acorn

Description: Introduced in 1989 in Oregon, it is a selection from *Q. robur* 'Fastigiata' which retains a tighter branching habit and has smaller leaves.

Advantages: The uniform, narrow shape is reliable, and suited to restricted spaces or architectural effects that are formal or give emphasis. Like the species, it tolerates drought, pollution, restricted root space, and a wide range of pH. Has moderate resistance to mildew.

Limitations: Availability is limited. Golden oak scale can be fatal, but occurs infrequently. No other serious diseases or insects have been reported.

Site and Culture: Transplants readily B&B in the spring, or can be planted bare root with extra care. Plant in full sun, in well-drained acid to slightly alkaline soil.

Notes:

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Skyrocket English Oak

Henry D. Gerhold, Penn State University

Northern Red Oak

Qu ru

Quercus rubra

Height:	60′ to 80′ (40′ at age 30)
Width:	45′ to 65′ (30′ at age 30)
Hardiness Zone:	5 to 8
Crown:	broadly ovate, somewhat open, medium texture
Foliage:	5″ to 8″, bright reddish or golden brown in fall
Flowers:	inconspicuous
Fruit:	¾″ to 1″ acorns, heavy crops every 3 to 5 years

Description: A stately, fast growing tree native to moist sites in the eastern half of the U.S., extending into Canada but not the deep South. Dark gray bark, smooth at first, becomes furrowed with age. Moderately intolerant of shade.

Advantages: This sturdy tree can be used in lawns and parks, and also as a street tree where space is adequate. It tolerates urban conditions along streets with heavy traffic.

Limitations: Growth may be slow initially after transplanting, then becomes fast. Diseases and insects seldom cause serious problems, but it is susceptible to gypsy moth, oak wilt, cankers, anthracnose, borers, and several other pests. Acorns can be a litter problem in some years. Will heave sidewalks.

Site and Culture: Transplants readily, better if B&B and planted in the spring. Prefers well drained, acid soil and full sun. Becomes chlorotic on soils with pH greater than 7.5. Tolerates compacted soil, salt, and pollutants. Prune while the tree is dormant to avoid oak wilt disease vectors.

Cultivars: None generally available.

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Northern Red Oak

Ohio State University

Ohio State University

Ohio State University

Shumard Oak

Qu sh

Quercus shumardii

Height:	60′ to 80′ (40′ at age 30)
Width:	45′ to 65′ (30′ at age 30)
Hardiness Zone:	5 to 9
Crown:	conical, becoming broadly ovate with age, medium texture
Foliage:	5″ to 8″, lobes pointed and variable in outline, dark green with lighter underside, reddish brown to scarlet in fall
Flowers:	inconspicuous
Fruit:	1″ acorn, heavy crops at 2 to 3 year intervals.
Description:	A stately tree that is native to moist sites in southern and southeastern U.S., extending northward into southern Michigan and Pennsylvania. The dark gray bark is smooth at first, then becomes furrowed with age. It is moderately intolerant of shade. Growth rate is moderate to fast.
Advantages:	Tolerates urban conditions, including heavy traffic, pollution, salt, compacted soil, and drought. Resistant to iron deficiency on alkaline soils. It can be limbed up for clearance of vehicles.
Limitations:	Growth after transplanting is slow. The usual disease and insect problems of oaks are seldom serious, including oak wilt, anthracnose, cankers, gypsy moth, borers, or obscure scale. Acorns can be a litter problem in some years.
Site and Culture:	Transplants reasonably well B&B in the spring. Prefers full sun and well-drained soil which may be acid to slightly alkaline.
Cultivars:	None available.
Notes:	

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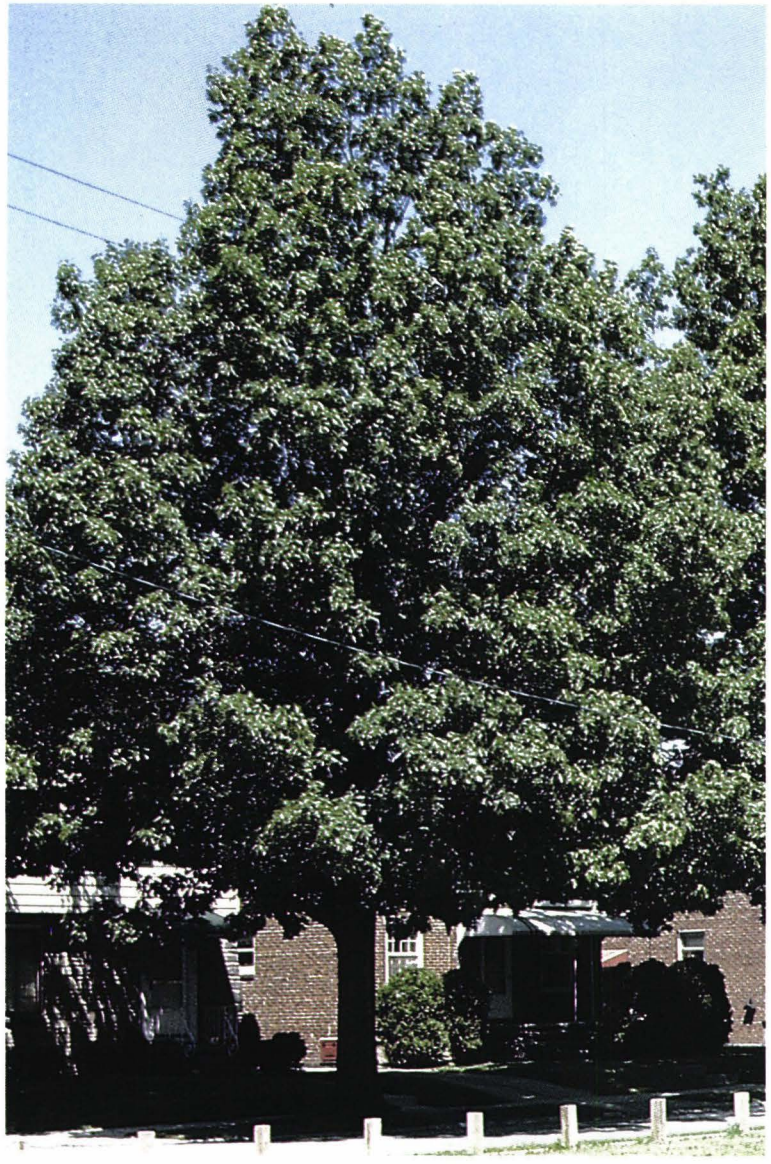
Shumard Oak



Ralph C. Sievert, Cleveland City Forester

T. Davis Sydnor, Ohio State University

Ralph C. Sievert, Cleveland City Forester

Pagodatree or Scholartree

So ja

Sophora japonica

Height: 40′ to 70′ (40′ at age 30)
Width: 40′ to 70′ (40′ at age 30)
Hardiness Zone: 5 to 8

Crown: broadly ovate, upward spreading branches, medium-fine texture
Foliage: compound, lustrous 1″ to 2″ leaflets, little fall color
Flowers: creamy white in long clusters, showy for several weeks in late summer
Fruit: 2″ to 4″ yellow-brown pods in clusters persist into fall

Description: A native of China, it has long been planted in Japan, and also grows well in Europe and North America. Growth is moderate at first, then slow. Flowering usually occurs after age 10. Bark is green on young branches, and on the trunk becomes grayish brown and furrowed with age.

Advantages: It is one of a few trees that flower in late summer. Useful as a specimen tree or along streets, it provides light shade and tolerates urban stresses and seacoast environments.

Limitations: Young trees are somewhat difficult to train in upright growth. Shedding of leaves, flowers, and fruit parts at different times causes litter problems. The flowers stain sidewalks. The species is susceptible to twig blight, canker, mildew, leaf hoppers, and scale insects, however usually these are not serious. Severe cold predisposes trees to *Nectria* canker.

Site and Culture: Transplant B&B in the spring into well drained soil and full sunlight. Tolerates a wide range of city conditions including drought, heat, and pollutants.

Cultivars: Selections have been made for improved growth habit, glossy foliage, and blooming at an earlier age.

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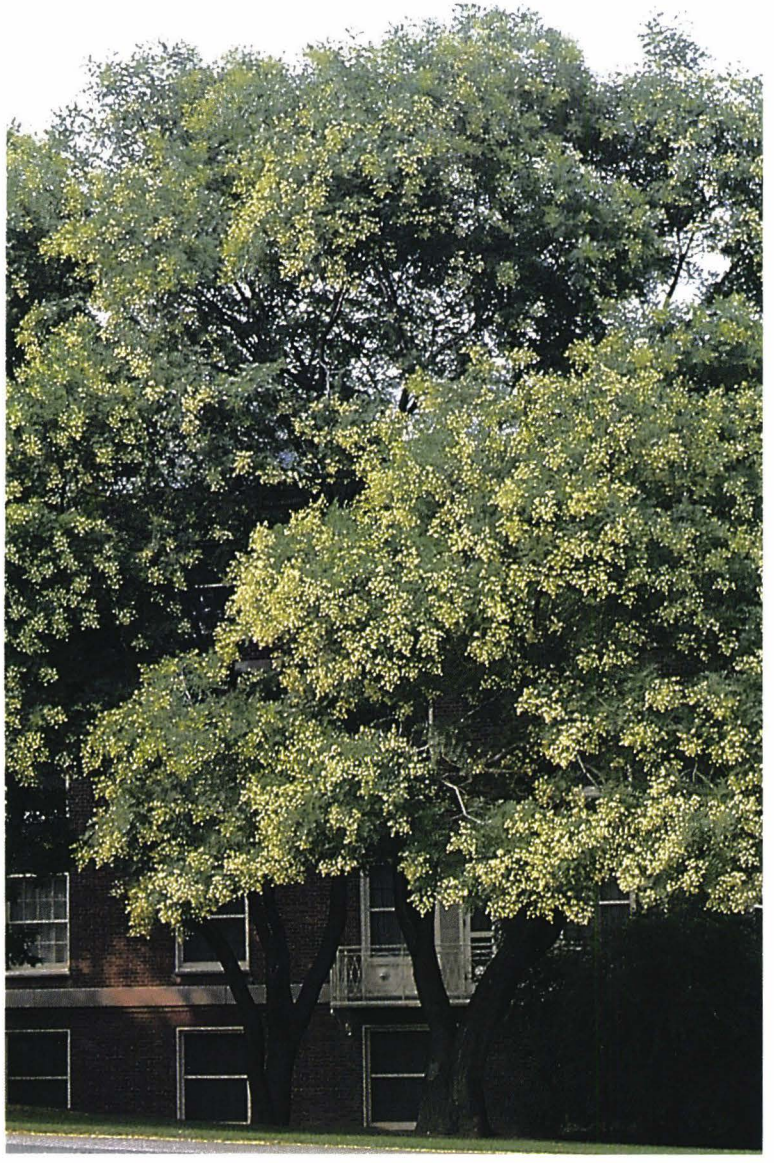
Pagodatree or Scholartree



Henry D. Gerhold, Penn State University

James W. Zampini, Lake County Nursery

Princeton Upright Scholartree

So ja PU

Sophora japonica **'Princeton Upright'**
P.P. 5524

Height:	40′ to 50′ (40′ at age 30)
Width:	25′ to 35′ (30′ at age 30)
Hardiness Zone:	6 to 8
Crown:	ovate, upright branching, medium-fine texture
Foliage:	glossy dark green
Flowers:	blooms at an earlier age than the species
Fruit:	same as species — 2″ to 4″ yellow-brown pods in clusters persist into fall

Description: Selected in New Jersey for its compact, upright branching habit and glossy, dark green foliage. It was introduced in 1985.

Advantages: The more compact crown and upright branching make it well suited to narrow streets or other confined spaces. It is also superior to the species in foliage, flowering, and better resistance to pests and diseases.

Limitations: It has better juvenile form and resistance to leafhoppers than the species. Otherwise, species limitations apply. Young trees are somewhat difficult to train in upright growth. Shedding of leaves, flowers, and fruit parts at different times cause litter problems. The flowers stain sidewalks. The species is susceptible to twig blight, canker, mildew, and scale insects, however usually these are not serious. Severe cold predisposes trees to *Nectria* canker.

Site and Culture: Species information applies. Transplant B&B in the spring into well drained soil and full sunlight. Tolerates a wide range of city conditions including drought, heat, and pollutants.

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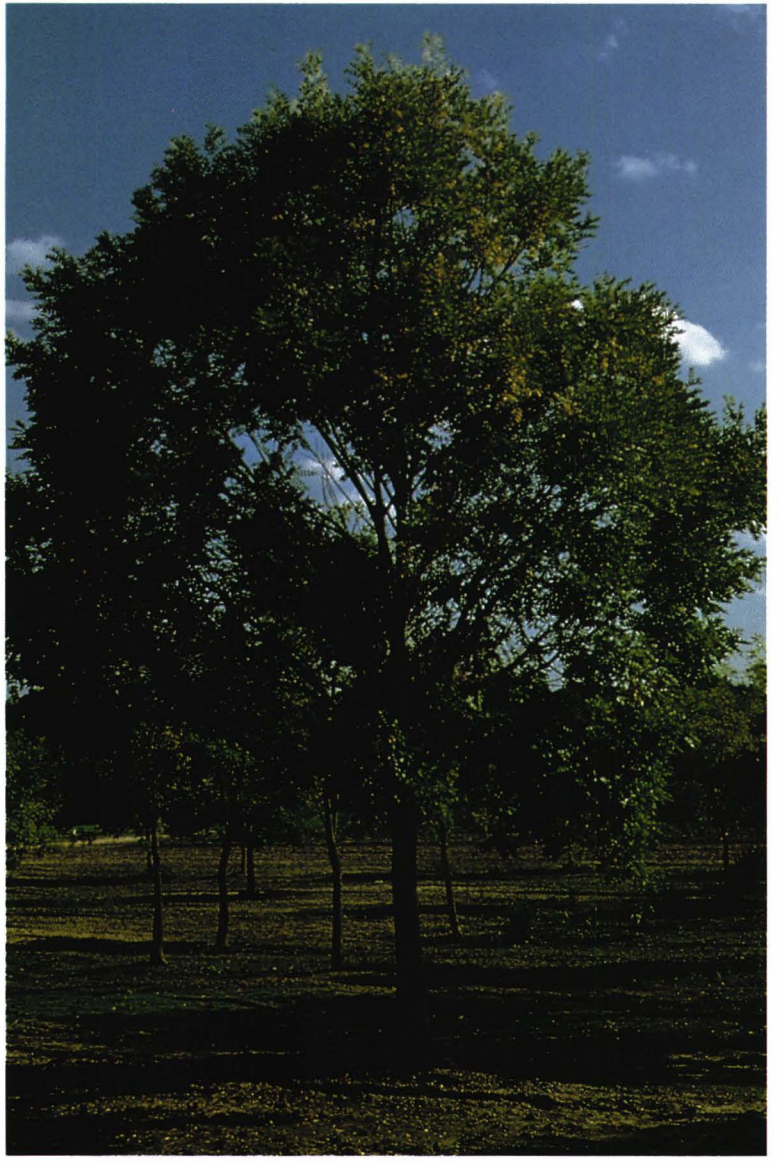
Princeton Upright Scholartree



William Flemer III, Princeton Nurseries

Regent Scholartree

So ja Re

Sophora japonica **'PNI 5625'**
P.P. 2338, trademarked

Height: 40′ to 50′ (45′ at age 30)
Width: 30′ to 40′ (35′ at age 30)
Hardiness Zone: 5 to 8

Crown: broadly ovate, upright branching, medium-fine texture
Foliage: glossy dark green
Flowers: blooms at an earlier age than the species
Fruit: same as species - 2″ to 4″ yellow-brown pods in clusters persist into fall

Description: Developed in New Jersey and introduced in 1964. It was selected as a seedling of the variety "Trinity" for its rapid growth, straight trunk, upright ovate crown, and glossy dark green foliage.

Advantages: The more uniform crown, upright branching, and tolerance of urban conditions make it well suited for use as a street tree. It is also superior to the species in foliage, flowering, and resistance to leafhoppers.

Limitations: It is less cold hardy but has better juvenile form and resistance to leafhoppers than the species. Otherwise, species limitations apply. Young trees are somewhat difficult to train in upright growth. Shedding of leaves, flowers, and fruit parts at different times cause litter problems. The flowers stain sidewalks. The species is susceptible to twig blight, canker, mildew, and scale insects, however usually these are not serious. Severe cold predisposes trees to *Nectria* canker.

Site and Culture: Species information applies. Transplant B&B in the spring into well drained soil and full sunlight. Tolerates a wide range of city conditions including drought, heat, and pollutants.

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Regent Scholartree

Robert Skiera, Milwaukee City Forester

Henry D. Gerhold, Penn State University

Henry D. Gerhold, Penn State University

Mountain-ash or Whitebeam

Sr

Sorbus (many species and hybrids)

Height:	most 15′ to 35′, some up to 55′ (35′ at age 30)
Width:	20′ to 30′, some to 45′ (25′ at age 30)
Hardiness Zone:	2 to 6
Crown:	shapes include columnar, conical, and ovate; medium or medium-fine texture
Foliage:	mountain-ashes have compound leaves with 1″ to 2½″ leaflets; whitebeam leaves are simple, downy, and 2″ to 4″; fall colors are yellow, orange, russet, or scarlet
Flowers:	white, creamy, or pinkish white clusters
Fruit:	showy red, orange, yellow, pink, or white berries persist into winter

Description: *Sorbus* contains Asian, European, and North American species. Hybrids have been produced among the whitebeams and mountain ashes, between these two groups, and even with other genera. The species occupy a wide variety of habitats, generally cool and moist.

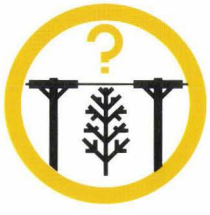
Advantages: They provide bright splashes of color to the landscape throughout the growing season and into winter. Some cultivars make excellent street trees in cool climates.

Limitations: They are not long lived and require cool nights. Fireblight and borers can be severe problems, especially in warm climates. Some cultivars have weak crotches. Susceptible to cankers, leaf rusts, crown gall, scab, leafhopper, scales, and several other insects.

Site and Culture: Transplant B&B. Adaptable to many soil types, all species prefer acid soil, full sun, and cool climates. Some cultivars are quite tolerant of urban conditions.

Cultivars: Many have been selected for ornamental traits. Those used as street trees in Europe are not readily available here.

Notes:



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Mountain-ash or Whitebeam

Henry D. Gerhold, Penn State University

Henry D. Gerhold, Penn State University

Henry D. Gerhold, Penn State University

Ivory Silk Japanese Tree Lilac

Sy rt IS

Syringa reticulata **'Ivory Silk'** Tree Form

Height:	20′ to 30′ (25′ at age 30)
Width:	15′ to 20′ (15′ at age 30)
Hardiness Zone:	3 to 8
Crown:	ovate, medium texture
Foliage:	dark green, without notable fall color
Flowers:	in late spring bears large creamy-white flower clusters at an early age
Fruit:	clusters of capsules, turning from green to brown
Description:	A small tree with stiff branches that is native to Japan. It has a reddish brown, cherry-like bark that becomes gray and scaly with age. Growth rate is medium. 'Ivory Silk' was introduced in Ontario, Canada, about 1975. It is a vigorous, sturdy, upright tree with a straight trunk.
Advantages:	Superior to trees grown from seed. The small size, upright habit, and attractive flowers, fruit, and bark make it a versatile tree well suited for use along streets. It is relatively pest-free. Good for planting under utility lines or in planters. Grows faster than 'Summer Snow'.
Limitations:	Susceptible to powdery mildew and lilac borer, but much less than common lilac.
Site and Culture:	Transplants readily. Prefers full sun, well drained soil, pH 6.5 to 8.0.
Notes:	

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Ivory Silk Japanese Tree Lilac

Edward R. Hasselkus, University of Wisconsin

Donald R. Selinger, Bailey Nurseries

William Hendricks, Klyn Nurseries

Regent Japanese Tree Lilac

Sy rt Re

Syringa reticulata **'PNI 5723'** Tree Form
trademarked

Height:	25′ to 30′ (25′ at age 30)
Width:	15′ to 20′ (15′ at age 30)
Hardiness Zone:	3 to 7
Crown:	ovate, medium texture
Foliage:	dark green, without notable fall color
Flowers:	pure white flower clusters
Fruit:	clusters of capsules, turning green to brown
Description:	A species native to Japan, it has stiff branches and a reddish brown, cherry-like bark that becomes gray and scaly with age. Regent was introduced 1988 in New Jersey as a vigorous, upright growing cultivar.
Advantages:	More vigorous than other cultivars and superior to trees grown from seed. The small size and attractive flowers and bark commend this tree for planting under utility lines, in planters, or other places where space is limited.
Limitations:	Susceptible to lilac borer, cankers, and powdery mildew, but much less than common lilac. Availability is limited in some regions.
Site and Culture:	Transplants readily. Prefers full sun, well drained soil, pH 6.5 to 8.0
Notes:	

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Regent Japanese Tree Lilac

William Flemer III, Princeton Nurseries

William Flemer III, Princeton Nurseries

Summer Snow Japanese Tree Lilac

Sy rt SS

Syringa reticulata **'Summer Snow'** Tree Form

Height:	20′ to 25′ (20′ at age 30)
Width:	20′ to 25′ (15′ at age 30)
Hardiness Zone:	3 to 8
Crown:	globose, medium texture
Foliage:	glossy dark green, without notable fall color
Flowers:	in late spring bears large creamy-white flower clusters at an early age
Fruit:	clusters of capsules, turning from green to brown
Description:	A small tree with stiff branches that is native to Japan. It has a reddish brown, cherry-like bark that becomes gray and scaly with age. Growth rate is medium. 'Summer Snow' was introduced in New York. It is a vigorous, compact tree with a dependable form that is somewhat broader than 'Ivory Silk' and slower growing.
Advantages:	Superior to trees grown from seed. The small size, compact habit, and attractive flowers and bark make it a versatile tree well suited for use along streets. It is relatively pest-free. Grows well in planters and under utility lines.
Limitations:	Susceptible to powdery mildew and lilac borer, but much less than common lilac.
Site and Culture:	Transplants readily. Prefers full sun, well drained soil, pH 6.5 to 8.0.
Notes:	

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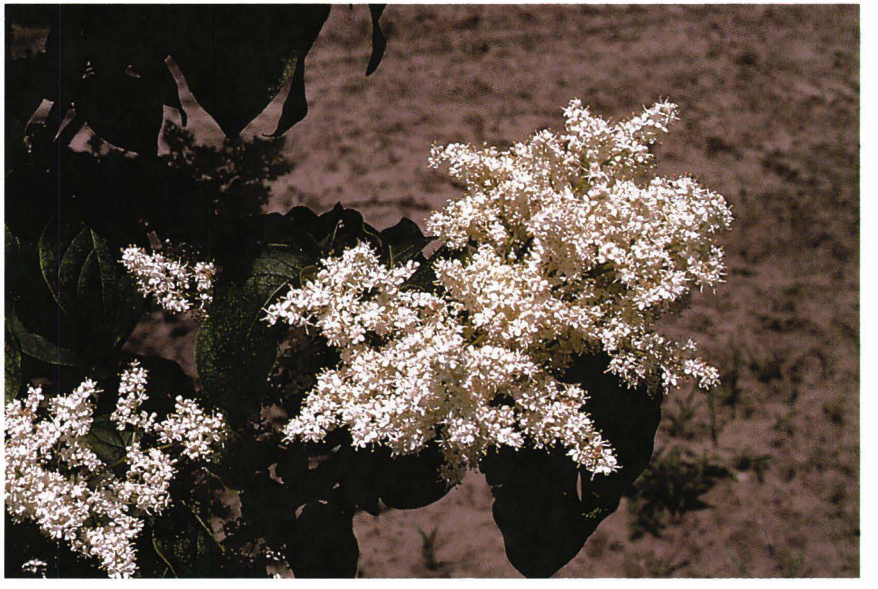
Summer Snow Japanese Tree Lilac

William Hendricks, Klyn Nurseries



Donald R. Selinger, Bailey Nurseries

Baldcypress

Ta di

Taxodium distichum

Height: 60′ to 80′ (50′ at age 30)
Width: 20′ to 45′ (30′ at age 30)
Hardiness Zone: 5 to 9

Crown: conical to columnar, medium-fine texture
Foliage: deciduous ½″ to 1″ needles, orange or pink to rusty-brown in fall
Flowers: inconspicuous
Fruit: 1½″ cones disintegrate when mature

Description: Native to swamps and river bottoms in southern U.S., it has been grown successfully as far north as Canada. Cypress knees are formed only on wet sites. The trunk becomes buttressed, and bark is reddish or grayish brown and fibrous. It is intolerant to shade, and growth rate is moderate to fast.

Advantages: In landscape plantings it has been used mainly as a specimen or grove of trees in parks. More recently it has been found suitable as a street tree in urban conditions.

Limitations: Becomes chlorotic above pH 7.5. Relatively free of diseases and insects. Infrequently susceptible to twig blight, canker, and cypress moth. Availability of cultivars is limited.

Site and Culture: Transplant B&B in spring, preferably in well drained, acid soil and full sun. Tolerates compacted or wet soil.

Cultivars: 'Shawnee Brave' (P.P. 3551) and 'Prairie Sentinel' (P.P. 3548), *T. ascendens* have narrow conical crowns. 'Monarch of Illinois' (P.P. 3547) is unusually wide spreading.

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Baldcypress

Henry D. Gerhold, Penn State University

Henry D. Gerhold,
Penn State University

William Hendricks, Klyn Nurseries

Legend American Linden

Ti am Lg

Tilia americana **'Wandell'**
Patent applied for, trademarked

Height: 50′ to 70′ (45′ at age 30)
Width: 35′ to 50′ (35′ at age 30)
Hardiness Zone: 4 to 7

Crown: broadly conical, medium-coarse texture
Foliage: lustrous dark green leaves, somewhat smaller than the species
Flowers: pale yellow, fragrant, attractive to bees
Fruit: ¼″ globose nutlets with bracts

Description: The species typically occurs on cool, moist sites in northeastern and midwestern U.S. and Ontario. 'Legend' was selected in Illinois and introduced in 1988. It has upright, well placed branches, a single leader growth habit, light gray bark, and bright red buds and twigs in winter. Growth rate is medium to fast.

Advantages: The dependable, attractive growth habit and reasonably good adaptability to urban conditions commend this tree for spacious tree lawns and parks.

Limitations: 'Legend' is intolerant of salt and is somewhat sensitive to air pollutants. It is susceptible to *Verticillium* wilt, mildew, leaf blight, cankers, aphids, Japanese beetles, mites, and other defoliators, but these are seldom serious.

Site and Culture: Prefers moist, fertile soil but tolerates drier sites. Transplants readily, is shade tolerant, but grows well in full sun. Basal sprouts require occasional pruning.

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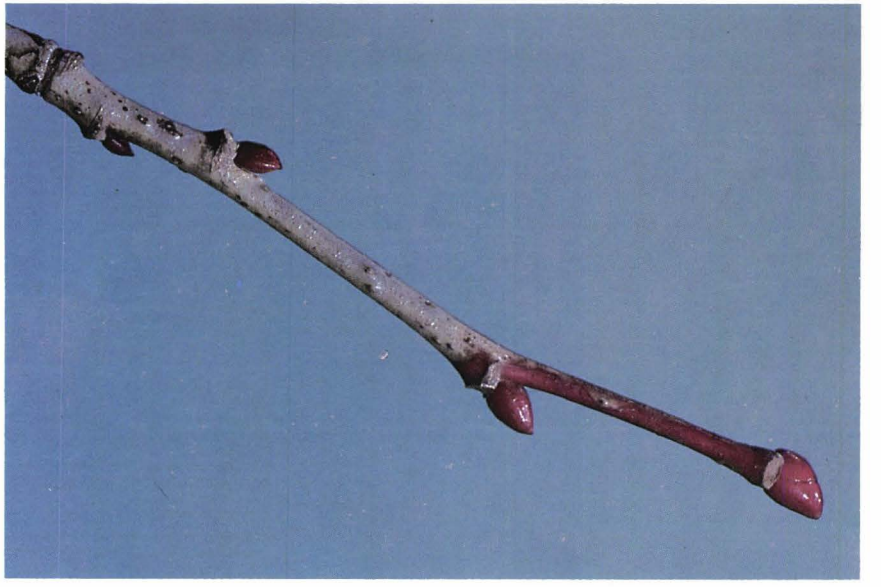
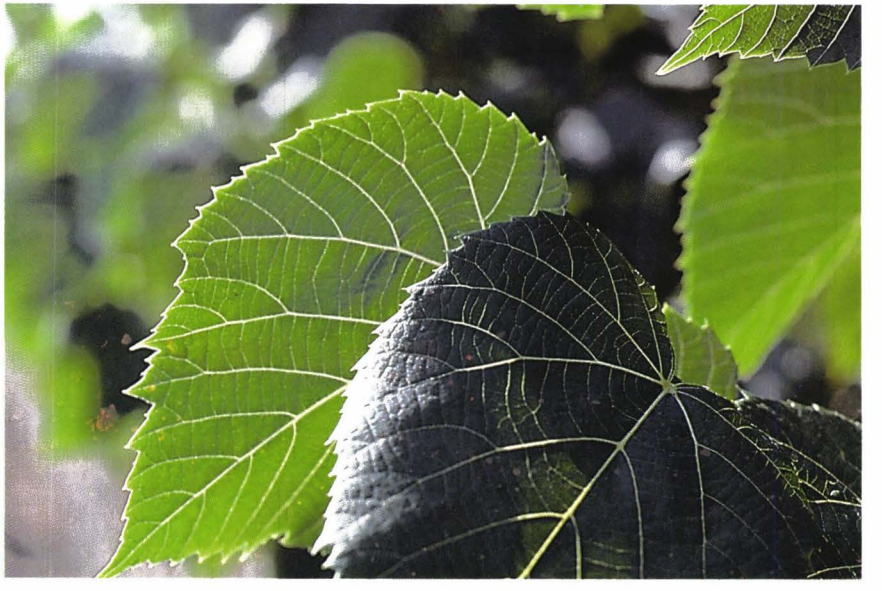
Legend American Linden

Willet N. Wandell, Discov-Tree Research



Willet N. Wandell, Discov-Tree Research



Keith Warren, J. Frank Schmidt & Son

Redmond American Linden

Ti am Rd

Tilia americana **'Redmond'**

Height: 50′ to 70′ (45′ at age 30)
Width: 30′ to 45′ (30′ at age 30)
Hardiness Zone: 3 to 7

Crown: conical, medium-coarse texture
Foliage: light green leaves
Flowers: pale yellow, fragrant, attractive to bees
Fruit: globose nutlets with bracts

Description: The species typically occurs on cool, moist sites in northeastern and midwestern U.S. and Ontario. 'Redmond' was selected in Nebraska and introduced in 1942 as a named cultivar, though it had been grown since 1927. It has also been known as *T. euchlora* 'Redmond'. Its branch structure is strong and the crown has a tight, refined appearance. The new twig growth is crimson. Growth rate is medium to fast and it has an upright growth habit.

Advantages: The dependable, attractive growth habit and reasonably good adaptability to urban conditions commend this tree for spacious tree lawns and parks.

Limitations: 'Redmond' is intolerant of salt and somewhat sensitive to air pollutants. It is susceptible to *Verticillium* wilt, cankers, aphids, Japanese beetles, mites, and other defoliators but these are seldom serious. Older trees drop fruits for several weeks, causing litter problems.

Site and Culture: Prefers moist, fertile soil but tolerates drier sites. Transplants readily, is shade tolerant, but grows well in full sun. Basal sprouts require occasional pruning.

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Redmond American Linden

Edward R. Hasselkus, University of Wisconsin

Edward R. Hasselkus, University of Wisconsin

Littleleaf Linden

Ti co

Tilia cordata

Height:	60′ to 80′ (45′ at age 30)
Width:	35′ to 55′ (30′ at age 30)
Hardiness Zone:	3 to 7
Crown:	conical in youth, changing to ovate, dense branching, medium texture
Foliage:	1½″ to 3″, heart shaped, dark shiny green; in fall yellow-green or yellow
Flowers:	yellowish, pendulous clusters, very fragrant and attractive to bees
Fruit:	globose nutlets with bracts

Description: This species, native to Europe, is popular as a street tree in many countries. The name littleleaf has misled some into thinking the tree is small, but it is not. The bark is gray brown, and becomes furrowed with age.

Advantages: A fine shade tree for streets, parking lots, and spacious lawns. More tolerant of heat and compacted soil than *T. americana.* Adapts well to above-ground planters and other stressful conditions.

Limitations: Despite susceptibility to various insects and diseases, control measures are seldom needed. Defoliation by Japanese beetles, caterpillars, or linden looper is common. Aphids exude a sticky fluid. Other insect damage is caused by mites, scales, and the walnut lacebug. Susceptible to cankers and mildew. Bark splits after sunscald may be caused by understock that lacks vigor.

Site and Culture: Grows best on deep, fertile soils, but broadly adaptable to pH, compaction, and full sun to partial shade. Somewhat sensitive to drought and salt. Transplants readily. May require occasional pruning of basal sprouts.

Cultivars: Many cultivars have been selected for superior branching, vigor, foliage, and crown form. These are preferable to trees grown from seed, which are highly variable.

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Littleleaf Linden

Ohio State University

Ohio State University

Ohio State University

Chancellor Littleleaf Linden

Ti co Ch

Tilia cordata **'Chancole'**
P.P. 2712, trademarked

Height: 50′ to 70′ (50′ at age 30)
Width: 20′ to 30′ (20′ at age 30)
Hardiness Zone: 3 to 7

Crown: narrowly conical, compact, medium texture
Foliage: shiny dark green
Flowers: same as species—fragrant and attractive to bees
Fruit: same as species—globose nutlets with bracts

Description: Selected in Ohio for use as a street tree and introduced in 1967. It has sturdy branches with consistent upward angles. Growth is more rapid than the species.

Advantages: Symmetrical, narrow crown, improved branching habit, a straight trunk, and tolerance of urban conditions.

Limitations: Availability may be limited in some regions. Species limitations apply. Despite susceptibility to various insects and diseases, control measures are seldom needed. Defoliation by Japanese beetles, caterpillars, or linden looper is common. Aphids exude a sticky fluid. Other insect damage is caused by mites, scales, and the walnut lacebug. Susceptible to cankers and mildew. Bark splits after sunscald may be caused by understock that lacks vigor. Occasional incompatibility with rootstock has been reported.

Site and Culture: Species information applies. Grows best on deep, fertile soils, but broadly adaptable to pH, compaction, and full sun to partial shade. Somewhat sensitive to drought and salt. Transplants readily. May require frequent pruning of basal sprouts.

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Chancellor Littleleaf Linden

Keith Warren, J. Frank Schmidt & Son

Henry D. Gerhold,
Penn State University

Corinthian Littleleaf Linden

Ti co Co

Tilia cordata **'Corzam'**
trademarked

Height: 45′ to 65′ (45′ at age 30)
Width: 15′ to 25′ (15′ at age 30)
Hardiness Zone: 3 to 7

Crown: narrowly conical, compact, medium texture
Foliage: thick, small, shiny dark green leaves
Flowers: same as species—fragrant and attractive to bees
Fruit: same as species—globose nutlets with bracts

Description: Selected in Ohio and introduced in 1988. It has dense branching, evenly spaced limbs, and leaves that are smaller, thicker, and glossier than the species. Growth rate is medium.

Advantages: Formal appearance with a symmetrical, narrow crown, improved branching habit, a straight trunk, and tolerance of urban conditions.

Limitations: Availability may be limited in some regions. Species limitations apply. Despite susceptibility to various insects and diseases, control measures are seldom needed. Defoliation by Japanese beetles, caterpillars, or linden looper is common. Aphids exude a sticky fluid. Other insect damage is caused by mites, scales, and the walnut lacebug. Susceptible to cankers and mildew. Bark splits after sunscald may be caused by understock that lacks vigor.

Site and Culture: Species information applies. Grows best on deep, fertile soils, but broadly adaptable to pH, compaction, and full sun to partial shade. Somewhat sensitive to drought and salt. Transplants readily. May require frequent pruning of basal sprouts.

Notes:

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Corinthian Littleleaf Linden

James W. Zampini, Lake County Nursery

James W. Zampini,
Lake County Nursery

Henry D. Gerhold,
Penn State University

Fairview Littleleaf Linden

Ti co Fa

Tilia cordata **'Fairview'**
P.P. 3259, trademarked

Height: 50′ to 70′ (50′ at age 30)
Width: 35′ to 50′ (35′ at age 30)
Hardiness Zone: 3 to 7

Crown: broadly conical, medium texture
Foliage: thick, shiny dark green leaves
Flowers: same as species—fragrant and attractive to bees
Fruit: same as species—globose nutlets with bracts

Description: Selected in Oregon and introduced in 1973. It has symmetrical branching, a somewhat open and less formal crown, evenly spaced branches, and leaves that are smaller, thicker, and glossier than the species. Growth rate is rapid.

Advantages: A less formal appearance than most other cultivars with a symmetrical crown, sturdy branching habit, a straight trunk, and tolerance of urban conditions.

Limitations: Availability may be limited in some regions. Species limitations apply. Despite susceptibility to various insects and diseases, control measures are seldom needed. Defoliation by Japanese beetles, caterpillars, or linden looper is common. Aphids exude a sticky fluid. Other insect damage is caused by mites, scales, and the walnut lacebug. Susceptible to cankers and mildew. Bark splits after sunscald may be caused by understock that lacks vigor.

Site and Culture: Species information applies. Grows best on deep, fertile soils, but broadly adaptable to pH, compaction, and full sun to partial shade. Somewhat sensitive to drought and salt. Transplants readily. May require frequent pruning of basal sprouts.

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Fairview Littleleaf Linden

Henry D. Gerhold, Penn State University

Glenleven Littleleaf Linden

Ti co Gl

Tilia cordata **'Glenleven'**

Height:	50′ to 70′ (50′ at age 30)
Width:	35′ to 50′ (35′ at age 30)
Hardiness Zone:	3 to 8
Crown:	conical, symmetrical, medium texture
Foliage:	dark green leaves are larger than other *T. cordata*
Flowers:	same as species — fragrant and attractive to bees
Fruit:	same as species — globose nutlets with bracts

Description: Selected in Ontario, Canada and introduced in 1963. Probably it should be named *Tilia* x *flavescens* 'Glenleven', as authorities believe it is a cross between *T. cordata* x *T. americana.* It has a straight, upright growth habit and may be faster growing than any littleleaf linden cultivar. Its crown is less dense than some others.

Advantages: Vigorous growth, a straight trunk, improved branching habit, and tolerance of urban conditions.

Limitations: Species limitations apply. Despite susceptibility to various insects and diseases, control measures are seldom needed. Defoliation by Japanese beetles, caterpillars, or linden looper is common. Aphids exude a sticky fluid. Other insect damage is caused by mites, scales, and the walnut lacebug. Susceptible to cankers and mildew. Bark splits after sunscald may be caused by understock that lacks vigor.

Site and Culture: Species information applies. Grows best on deep, fertile soils, but broadly adaptable to pH, compaction, and full sun to partial shade. Somewhat sensitive to drought and salt. Transplants readily. May require occasional pruning of basal sprouts.

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Glenleven Littleleaf Linden

Donald R. Selinger, Bailey Nurseries

Edward R. Hasselkus, University of Wisconsin

Greenspire Littleleaf Linden

Ti co Gr

Tilia cordata **'PNI 6025'**
P.P. 2086, trademarked

Height:	50′ to 70′ (45′ at age 30)
Width:	35′ to 50′ (30′ at age 30)
Hardiness Zone:	3 to 9
Crown:	conical, symmetrical, medium texture
Foliage:	leathery, small, dark green leaves
Flowers:	same as species — fragrant and attractive to bees
Fruit:	same as species — globose nutlets with bracts

Description: Selected in New Jersey among the progeny of 'Euclid' and 'Boston', and introduced in 1963. It has a dense, upright growth habit, and a strong central leader. Growth is more rapid than the species.

Advantages: Symmetrical vigorous growth, a straight trunk, improved branching habit, and tolerance of urban conditions.

Limitations: Species limitations apply. Despite susceptibility to various insects and diseases, control measures are seldom needed. Defoliation by Japanese beetles, caterpillars, or linden looper is common. Aphids exude a sticky fluid. Other insect damage is caused by mites, scales, and the walnut lacebug. Susceptible to cankers and mildew. Bark splits after sunscald may be caused by understock that lacks vigor..

Site and Culture: Species information applies. Grows best on deep, fertile soils, but broadly adaptable to pH, compaction, and full sun to partial shade. Somewhat sensitive to drought and salt. Transplants readily. May require occasional pruning of basal sprouts.

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Greenspire Littleleaf Linden

Henry D. Gerhold, Penn State University

Donald R. Selinger,
Bailey Nurseries

Keith Warren,
J. Frank Schmidt & Son

Silver Linden

Ti to

Tilia tomentosa

Height:	60′ to 70′ (45′ at age 30)
Width:	45′ to 55′ (35′ at age 30)
Hardiness Zone:	4 to 8
Crown:	broadly conical to ovate, dense and symmetrical, medium texture
Foliage:	3″, lustrous dark green and silvery underside, shimmering in the wind
Flowers:	yellowish-white, bracted, fragrant, pendulous
Fruit:	1/3″ nutlet, light seed crops mostly persist and dry on the tree

Description: The species is native to southeastern and eastcentral Europe. The bark initially is gray and smooth, later becoming gray-brown and furrowed. The growth rate is medium.

Advantages: The tailored crown, silvery foliage, and good branching habit make this an attractive tree for broad streets and parks. It tolerates heat, drought, and pollution.

Limitations: The species is reputed to have limitations similar to *Tilia cordata.* Thus aphid exudations may be the principal problem.

Site and Culture: Transplants readily, and recovers well. Grows best on deep, fertile soils, but is broadly adaptable to pH, compaction, and full sun to partial shade. May require occasional pruning of basal sprouts.

Cultivars: Cultivars are preferable where their uniformity is desired, compared to the more variable species.

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Silver Linden

Henry D. Gerhold, Penn State University

Green Mountain Silver Linden

Ti to GM

Tilia tomentosa **'PNI 6051'**
trademarked

Height: 50′ to 70′ (45′ at age 30)
Width: 45′ to 55′ (35′ at age 30)
Hardiness Zone: 4 to 8

Crown: broadly conical to ovate, dense and symmetrical, medium texture
Foliage: lustrous dark green with silvery underside, shimmering in the wind, yellow in the fall
Flowers: yellowish-white, bracted, pendulous, fragrant, narcotic to bees
Fruit: 1/3″ nutlet, light seed crops mostly persist and dry on the tree

Description: Formerly known as the Princeton strain, it first appeared as Green Mountain silver linden in the 1988-1989 catalog. The tree grows rapidly and has a dense, handsome form.

Advantages: The handsome crown, contrasting green and silvery foliage, and good branching habit make this an attractive tree for broad streets and parks. It tolerates heat, drought, and pollution, and is somewhat resistant to Japanese beetle feeding.

Limitations: Availability may be limited in some regions. The species is reputed to have various disease and insect problems, none of them very serious.

Site and Culture: Transplants readily, and recovers well. Grows best on deep, fertile soils, but is broadly adaptable to pH, compaction, and full sun to partial shade. May require occasional pruning of basal sprouts.

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Green Mountain Silver Linden

William Flemer III, Princeton Nurseries

William Flemer III,
Princeton Nurseries

Sterling Silver Linden

Ti to St

Tilia tomentosa **'Wandell'**
P.P. 6511, trademarked

Height: 50′ to 70′ (45′ at age 30)
Width: 45′ to 55′ (35′ at age 30)
Hardiness Zone: 4 to 8

Crown: broadly conical to ovate, dense and symmetrical, medium texture
Foliage: dark green with silvery underside, shimmering in the wind, yellow in the fall
Flowers: yellowish-white, bracted, pendulous, fragrant, narcotic to bees
Fruit: 1/3′′ nutlet, light seed crops mostly persist and dry on the tree

Description: Selected along a street in an Illinois nursery, and introduced in 1988. The tree grows rapidly and has a neat, tailored form.

Advantages: The handsome crown, contrasting green and silvery foliage, and good branching habit make this an attractive tree for broad streets and parks. It tolerates heat, drought, and pollution, and is somewhat resistant to Japanese beetle feeding. Seed crops are light.

Limitations: Availability may be limited in some regions. The species is reputed to have various disease and insect problems, none of them very serious.

Site and Culture: Transplants readily, and recovers well. Grows best on deep, fertile soils, but is broadly adaptable to pH, compaction, and full sun to partial shade. May require occasional pruning of basal sprouts.

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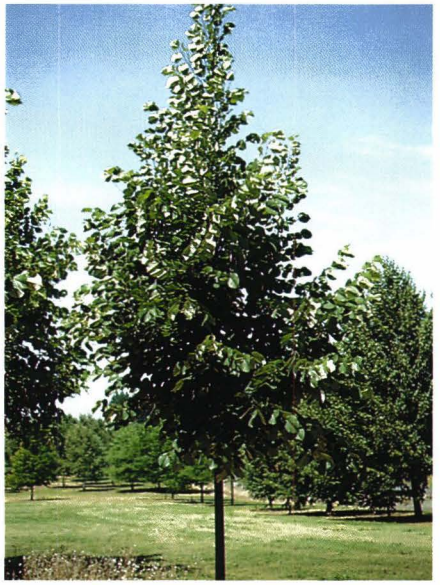
Sterling Silver Linden

Willet N. Wandell, Discov-Tree Research



Henry D. Gerhold,
Penn State University

Willet N. Wandell, Discov-Tree Research

American Elm

Ul am

Ulmus americana

Height:	70′ to 90′ (50′ at age 30)
Width:	70′ to 90′ (45′ at age 30)
Hardiness Zone:	2 to 9
Crown:	vase-shaped, medium texture
Foliage:	3″ to 5″, bright green, yellow in fall
Flowers:	inconspicuous
Fruit:	½″ disc, matures in spring

Description: Once prized for their graceful beauty, with arched branches shading wide streets, millions of elms have been killed by Dutch elm disease (DED) since it invaded in 1930. In a few places elms are being maintained through costly spray and sanitation programs. The species is native to a wide range of sites throughout eastern U.S. and Canada.

Advantages: Elms have very high tolerance of urban conditions and seacoast environments, which is another reason they had been planted as monocultures, besides their beauty.

Limitations: Any community that plants American elm should be prepared to implement a carefully timed spray program annually, and to remove and dispose of diseased trees promptly after DED has been diagnosed. Phloem necrosis (PN), a fatal disease also known as elm yellows, and elm leaf beetle cause severe damage in some regions. Other diseases and insects cause less serious injuries. Availability of resistant cultivars may be a problem.

Site and Culture: Transplants readily and grows vigorously over a wide range of sites and under adverse conditions.

Cultivars: 'Delaware II' has an irregular growth habit, is resistant to DED but susceptible to PN. 'Princeton' is vase shaped and has improved resistance to DED and the elm leaf beetle. 'Washington' has the classical vase shape, and is DED-resistant but PN- susceptible. 'Liberty' is a mixture of six clones selected for DED resistance that can be expected to have variable disease resistance and growth habits.

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American Elm

Henry D. Gerhold, Penn State University

Henry D. Gerhold,
Penn State University

Lacebark Elm or Chinese Elm

Ul pa

Ulmus parvifolia

Height: 50′ to 75′ (45′ at age 30)
Width: 30′ to 75′ (35′ at age 30)
Hardiness Zone: 5 to 9

Crown: variably ovate to vase-shaped, fine texture
Foliage: 1″ to 2″, dark green, yellow to wine in fall
Flowers: inconspicuous
Fruit: ⅓″ disc, green becoming tan, matures in fall

Description: This species is native to China, Korea and Japan. It has high levels of resistance to Dutch elm disease (DED), phloem necrosis (elm yellows), and elm leaf beetle. Habit is variable and can have the idealized vase-shape, but more typically it has an ovate habit. It is slower growing than most elms.

Advantages: This elm, like others, has a very high degree of urban and stress tolerance. In addition, it is generally resistant to insect and disease problems of elms. Like all elms it is also tolerant of compacted, wet, droughty, acid, and alkaline soils.

Limitations: This species is prohibited from being planted in some municipalities, because it is often confused with Siberian elm. It can disrupt sidewalks and curbs when planted in areas which are too small. Its tendency to get into the sewer lines can also be a liability with old cast iron sewer lines. Less serious insect and disease problems are not well known. Availability may be a problem.

Site and Culture: This species responds very well to transplanting and growth is moderate. It is adaptable to a wide range of urban conditions.

Cultivars: 'Drake' is an evergreen selection used in the southern United States. It has weeping branch tips and a more typical elm-like habit. It would be expected to be less cold hardy than the species. 'Dynasty', 'Emerald Isle', Emerald Vase', 'King's Choice', 'Ohio', and 'Pathfinder' are promising cultivars that are more cold hardy than the species.

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Lacebark Elm or Chinese Elm

Steven R. Cothrel, Upper Arlington City Forester

James W. Zampini,
Lake County Nursery

Steven R. Cothrel, Upper Arlington City Forester

Dynasty Lacebark Elm

Ul pa Dy

Ulmus parvifolia **'Dynasty'**

Height: 50′ to 70′ (50′ at age 30)
Width: 50′ to 60′ (45′ at age 30)
Hardiness Zone: 5 to 9

Crown: vase-shaped, medium-fine texture
Foliage: 1″ to 2″, dark green, dull orange to red in the fall
Flowers: inconspicuous fall flowers
Fruit: 1/3″ disc, green becoming tan, matures in fall

Description: Derived from seed imported from Japan, from trees which may have originated in Korea. Selected at the National Arboretum and introduced in 1984, 'Dynasty' is a moderately fast growing, upright, vase-shaped tree. The dark gray bark has lighter patches, but the color contrast is not enough to be ornamental; older trees have fissures with rust-colored lenticels.

Advantages: High resistance to the most important diseases and insects of elms. Tolerant of urban stresses and a wide range of soils. More cold hardy than the species.

Limitations: Limited availability. Needs ample space and clearance from sidewalks, curbs, and sewer lines. The vase shape is more irregular than American elm.

Site and Culture: Transplants readily. Adaptable to extremes of pH, soil types, and urban stresses. Staking may be required for a year or two after planting.

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Dynasty Lacebark Elm

Henry D. Gerhold, Penn State University

Henry D. Gerhold,
Penn State University

Ohio Lacebark Elm

Ul pa Oh

Ulmus parvifolia **'Ohio'**

Height:	50′ to 60′ (40′ at age 30)
Width:	40′ to 50′ (35′ at age 30)
Hardiness Zone:	5 to 9
Crown:	vase-shaped, medium-fine texture
Foliage:	1′′ to 2′′, glossy green, grayish-red in the fall
Flowers:	inconspicuous fall flowers
Fruit:	1/3′′ disc, green becoming red-purple, matures in fall

Description: Selected 1982 in Ohio; evaluated in Ohio, Maryland, and the District of Columbia; and released in 1992. 'Ohio' is a moderately fast growing, vase-shaped tree with a crown similar to a more upright American elm. The dark gray-green bark flakes off with age, revealing ornamental gray-orange patches.

Advantages: High resistance to the most important diseases and insects of elms. Tolerant of urban stresses and a wide range of soils. More cold hardy than the species. The somewhat smaller stature than American elm makes it suitable for more confined spaces.

Limitations: Limited availability. Requires clearance from sidewalks, curbs, and sewer lines. The vase shape is more irregular than American elm.

Site and Culture: Transplants readily. Adaptable to extremes of pH, soil types, and urban stresses. Staking may be required for a year or two after planting.

Notes: 'Pathfinder' has similar characteristics.

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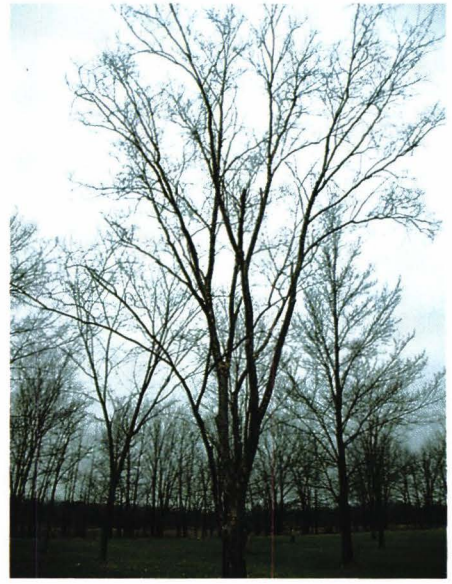
Ohio Lacebark Elm

Henry D. Gerhold, Penn State University



Henry D. Gerhold,
Penn State University

Henry D. Gerhold,
Penn State University

Prospector Elm

Ul wi Pr

Ulmus wilsoniana **'Prospector'**

Height: 45′ to 55′ (50′ at age 30)
Width: 40′ to 50′ (45′ at age 30)
Hardiness Zone: 4 to 7

Crown: vase-shaped, dense, medium-fine texture
Foliage: 4½′′, orange-tinted at emergence turning green, yellow in the fall
Flowers: inconspicuous
Fruit: disc-shaped

Description: Grown in Ohio from a seedlot of unknown Asiatic origin, 'Prospector' was selected in 1980 and released in 1990 after evaluation in California, Illinois, Maryland, Minnesota, Ohio, Oklahoma, Oregon, Tennessee, and Virginia. The dense, vase-shaped crown resembles American elm but becomes pendulous at a lower height. Growth rate is rapid.

Advantages: Resistant to Dutch elm disease, elm leaf beetle, elm yellows, and urban stresses. Its vase shape, intermediate size, and widespread adaptability suggest it could be an excellent tree for streets, parks, or other sites.

Limitations: Availability is limited. Disease resistant elms generally make good city trees, but it would be prudent to try this new cultivar in small numbers until more is known about its performance.

Site and Culture: Presumably will transplant readily and recover quickly. Elms generally are adaptable to a wide range of soils and urban stresses.

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Prospector Elm

Henry D. Gerhold, Penn State University

Henry D. Gerhold,
Penn State University

Hybrid Elms

Ul xx

Ulmus **hybrids**

Height: 50′ to 80′ (45′ at age 30)
Width: 30′ to 80′ (30′ at age 30)
Hardiness Zone: depends on the cultivar

Crown: depends on the cultivar
Foliage: green to dark green, turning yellow to golden in fall
Flowers: inconspicuous
Fruit: ½", disc-shaped, mature in the spring

Description: Elm breeders in the U.S. and Europe have succeeded in creating cultivars that have useful levels of resistance to Dutch elm disease (DED). Several European and Asiatic species have been hybridized, and therefore their crown forms differ from the idealized vase-shape of American elm.

Advantages: Elms have very high tolerance of urban and seacoast environments. Pest-resistant cultivars can have special appeal to those who are nostalgic for those over-arching trees that graced the streets of small town America.

Limitations: Cultivars with high resistance to DED are not immune, and may fall victim to the more virulent strains of the pathogen. Phloem necrosis (elm yellows), *Nectria* canker, and elm leaf beetles are other serious pest problems. Availability is limited.

Site and Culture: Hybrid elms respond well to transplanting and grow vigorously. They are adaptable to a wide range of urban environments. They tolerate compacted, wet, or droughty acid to alkaline soils, salt, and pollution. Plants propagated on their own roots are preferred.

Cultivars: Recent Dutch releases such as 'Groeneveld' (has heavy seed crops), 'Dodoens', 'Lobel', and 'Plantyn' have good resistance to DED, but their crown form is not vase-shaped and their winter hardiness has not been widely tested in the U.S. Factsheets follow for the more promising American releases.

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Hybrid Elms

Henry D. Gerhold, Penn State University

Frontier Hybrid Elm

Ul xx Fr

Ulmus **'Frontier'**

Height: 40′ to 50′ (40′ at age 30)
Width: 25′ to 35′ (25′ at age 30)
Hardiness Zone: 5 to 8

Crown: conical to ovate, medium-fine texture
Foliage: 2½″, reddish tinted at emergence turning green, red-purple in the fall
Flowers: none by age 19
Fruit: none by age 19

Description: A hybrid between selected parents, *U. carpinifolia* x *U. parvifolia,* selected in Ohio, evaluated in California, Illinois, Minnesota, Ohio, Oklahoma, Oregon, Tennessee, and Virginia, and released in 1990. It grows moderately fast and has ascending branches. The gray-green bark has large orange lenticels.

Advantages: Resistant to Dutch elm disease, moderately resistant to elm leaf beetle, and tolerant of elm yellows. It grows vigorously, tolerates urban stresses, and has attractive fall color. Apparently is seedless.

Limitations: Availability is limited. Disease resistant elms generally make good city trees, but it would be prudent to try this new cultivar in small numbers until more is known about its performance.

Site and Culture: Presumably will transplant readily and recover quickly. Elms generally are adaptable to a wide range of soils and urban stresses.

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Frontier Hybrid Elm

Henry D. Gerhold, Penn State University

Henry D. Gerhold, Penn State University

Homestead Hybrid Elm

Ul xx Ho

Ulmus **'Homestead'**

Height:	50′ to 60′ (50′ at age 30)
Width:	35′ to 45′ (30′ at age 30)
Hardiness Zone:	5 to 8
Crown:	conical, becoming arching with age, medium texture
Foliage:	dark green, yellow in fall
Flowers:	inconspicuous
Fruit:	½″, disc-shaped, mature in the spring

Description: A complex hybrid between *U. pumila* and a Dutch hybrid, it was developed in Ohio and introduced in 1984. It grows rapidly and develops rough, dark gray bark. The crown form is symmetrical and dense when young, later becoming arching.

Advantages: High resistance to Dutch elm disease and phloem necrosis (elm yellows), pleasing form, vigorous growth, and tolerance of urban stresses.

Limitations: Though not widely tested, it is susceptible to elm leaf beetle. Availability is limited.

Site and Culture: Responds well to transplanting, and grows vigorously. Adaptable to a wide range of urban environments. Tolerates compacted, wet, or droughty acid to alkaline soils, salt, and pollution. Plants propagated on their own roots are preferred.

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Homestead Hybrid Elm

Alden M. Townsend, U.S. National Arboretum

Henry D. Gerhold,
Penn State University

Pioneer Hybrid Elm

Ul xx Pi

Ulmus **'Pioneer'**

Height:	50′ to 60′ (50′ at age 30)
Width:	50′ to 60′ (40′ at age 30)
Hardiness Zone:	5 to 8
Crown:	globose, medium texture
Foliage:	large, dark green leaves, yellow in fall
Flowers:	inconspicuous
Fruit:	½″, disc-shaped, mature in the spring

Description: A hybrid between *U. glabra* and *U. carpinifolia,* it was developed in Ohio and introduced in 1984. It grows rapidly and develops a dense crown.

Advantages: High resistance to Dutch elm disease and phloem necrosis (elm yellows), pleasing form, vigorous growth, and tolerance of urban stresses.

Limitations: Though not widely tested, it is susceptible to elm leaf beetle. Availability is limited.

Site and Culture: Responds well to transplanting, and grows vigorously. Adaptable to a wide range of urban environments. Tolerates compacted, wet, or droughty acid to alkaline soils, salt, and pollution. Plants propagated on their own roots are preferred.

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Pioneer Hybrid Elm

Alden M. Townsend, U.S. National Arboretum

Keith Warren,
J. Frank Schmidt & Son

Henry D. Gerhold,
Penn State University

Regal Hybrid Elm

Ul xx Re

Ulmus **'Regal'**

Height:	55′ to 65′ (50′ at age 30)
Width:	40′ to 50′ (35′ at age 30)
Hardiness Zone:	4 to 7
Crown:	upright ovate, somewhat open, medium texture
Foliage:	3′′ to 5′′, dark green, little fall color
Flowers:	inconspicuous
Fruit:	disc-shaped, mature in the spring

Description: Selected in Wisconsin from a seedlot of complex hybrid parentage, obtained from the Dutch resistance breeding program. Introduced in 1983, the 'Regal' elm has a strong central leader, upright branching, a rather open habit, and a moderately fast growth rate.

Advantages: High resistance to Dutch elm disease and *Verticillium* wilt. More cold hardy and more narrow form than some other elm hybrids. Tolerant of urban stresses.

Limitations: Availability is limited. Susceptible to elm leaf beetle. Until more is known about its performance, it would be prudent to try this cultivar in small numbers.

Site and Culture: Responds well to transplanting, and grows vigorously. Adaptable to a wide range of urban environments. Tolerates compacted, wet, or droughty acid to alkaline soils, salt, and pollution. Plants propagated on their own roots are preferred.

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Regal Hybrid Elm

Henry D. Gerhold, Penn State University

Henry D. Gerhold,
Penn State University

Sapporo Autumn Gold Hybrid Elm

Ul xx SA

Ulmus **'Sapporo Autumn Gold'**
P.P. 3780

Height:	55′ to 70′ (55′ at age 30)
Width:	50′ to 60′ (50′ at age 30)
Hardiness Zone:	4 to 8
Crown:	irregular conical when young, potentially vase-shaped, medium texture
Foliage:	dark green leaves, yellow in fall
Flowers:	inconspicuous
Fruit:	½", disc-shaped, mature in the spring

Description: A hybrid between *U. pumila* and *U. japonica,* it was developed in Wisconsin and introduced in 1975. It grows rapidly, is densely foliated, and has an irregular, upright branching habit. Much pruning is required to develop a desirable vase shape.

Advantages: High resistance to Dutch elm disease and *Verticillium* wilt, more cold hardy than other cultivars, vigorous growth, and tolerance of urban stresses.

Limitations: Not widely tested, and natural form is far from ideal without pruning, which is difficult. It is susceptible to elm leaf beetle. Many branches die in the crown's interior. Availability is limited.

Site and Culture: Responds well to transplanting, and grows vigorously. Adaptable to a wide range of urban environments. Tolerates compacted, wet, or droughty acid to alkaline soils, salt, and pollution. Plants propagated on their own roots are preferred.

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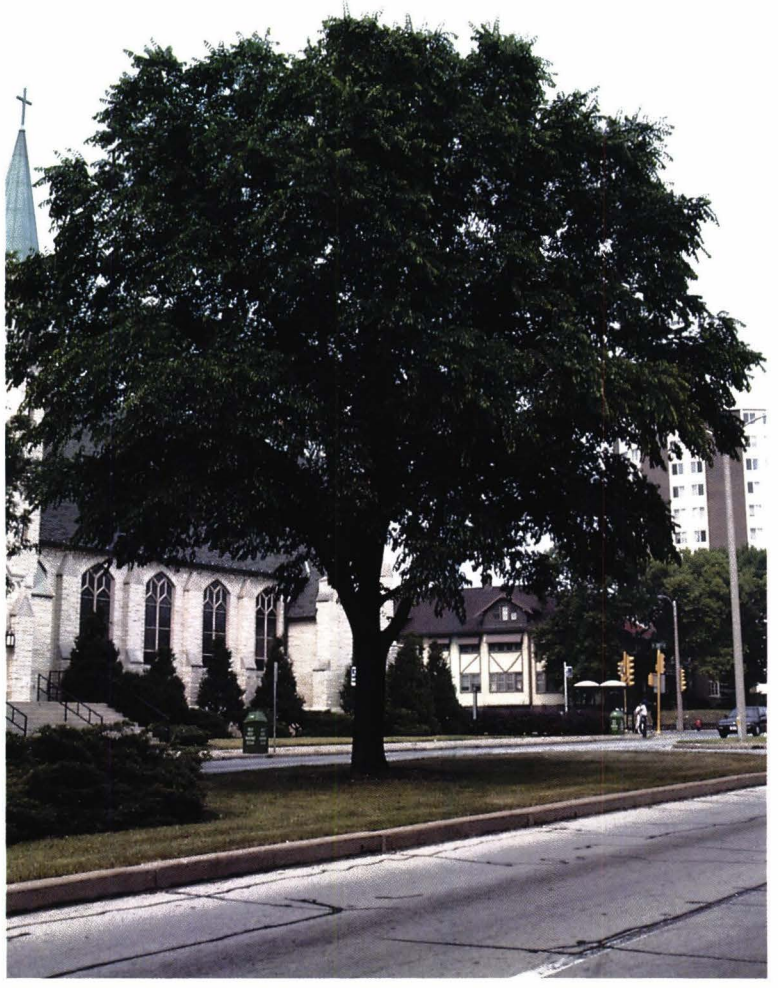
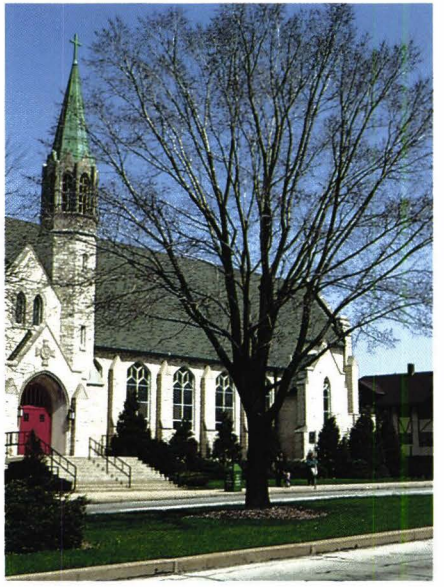
Sapporo Autumn Gold Hybrid Elm



Robert Skiera, Milwaukee City Forester



Henry D. Gerhold,
Penn State University

William H. Collins, Plant Materials Consultant

Urban Hybrid Elm

Ul xx Ur

Ulmus **'Urban'**

Height:	50′ to 60′ (55′ at age 30)
Width:	35′ to 45′ (40′ at age 30)
Hardiness Zone:	4 to 7
Crown:	dense ovate to broadly columnar, medium texture
Foliage:	green leaves, yellow in fall
Flowers:	inconspicuous
Fruit:	½″, disc-shaped, mature in the spring

Description: A hybrid between *U. pumila* and a Dutch hybrid, it was developed in Ohio and introduced in 1976. It grows rapidly, and has a profuse, ascending branching habit.

Advantages: High resistance to Dutch elm disease and phloem necrosis (elm yellows), vigorous growth, and tolerance of urban stresses.

Limitations: Not widely tested, but very susceptible to elm leaf beetle and cankers. Availability is limited.

Site and Culture: Responds well to transplanting, and grows vigorously. Adaptable to a wide range of urban environments. Tolerates compacted, wet, or droughty acid to alkaline soils, salt, and pollution. Plants propagated on their own roots are preferred.

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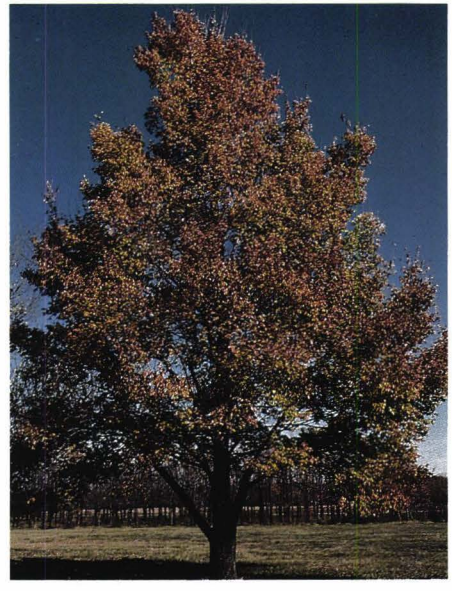
Urban Hybrid Elm

William H. Collins, Plant Materials Consultant

Henry D. Gerhold,
Penn State University



Alden M. Townsend,
U.S. National Arboretum

Green Vase Japanese Zelkova

Ze se GV

Zelkova serrata **'Green Vase'**
P.P. 5080, trademarked

Height: 60′ to 70′ (50′ at age 30)
Width: 50′ to 55′ (40′ at age 30)
Hardiness Zone: 5 to 8

Crown: vase-shaped, medium-fine texture
Foliage: 1½″ to 2½″ leaves, bright green, turning bronze-red in fall
Flowers: inconspicuous
Fruit: inconspicuous

Description: The species is native to Japan, Korea, and China. Typically it has ascending branches that form a vase-shaped crown, a short trunk, and bark that is smooth and gray when young, then flaky with small orange patches upon maturing. 'Green Vase' was selected in New Jersey for its rapid growth and good form, and was patented in 1983.

Advantages: Can be used as a substitute for American elm, having similar leaves and graceful form, though the branches are more numerous and the size is not as majestic. It is highly resistant to Dutch elm disease, and no serious pest problems are known. Has good tolerance of suburban and seacoast environments. Juvenile growth is more rapid and the form is less broad, compared to 'Village Green'; branches out higher, providing easier clearance.

Limitations: Can split at crotch because of narrow angle; susceptible to crotch cankers. May be susceptible to elm leaf beetle.

Site and Culture: Easy to transplant, and adaptable to pH, compacted soil, pollution, partial shade, and drought once established. Avoid planting in the fall. Young trees are susceptible to frost.

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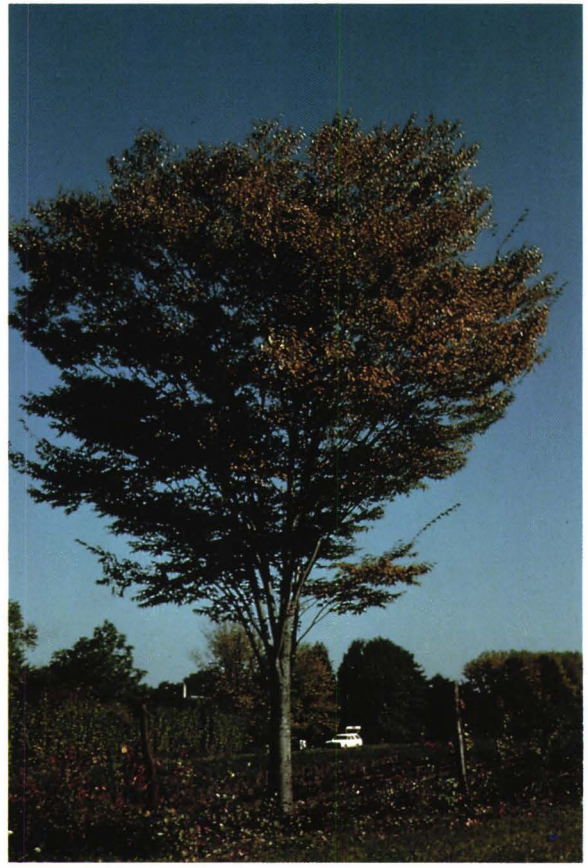
Green Vase Zelkova

William Flemer III, Princeton Nurseries



William Flemer III,
Princeton Nurseries

Halka Japanese Zelkova

Ze se Hl

Zelkova serrata **'Halka'**
P.P. 5687

Height: 60′ to 70′ (50′ at age 30)
Width: 35′ to 45′ (30′ at age 30)
Hardiness Zone: 6 to 8

Crown: vase-shaped, medium-fine texture
Foliage: 1½″ to 2″ leaves, green, yellowish in the fall
Flowers: inconspicuous
Fruit: inconspicuous

Description: The species is native to Japan, Korea, and China. Typically it has ascending branches that form a vase-shaped crown, a short trunk, and bark that is smooth and gray when young, then flaky with small orange patches upon maturing. 'Halka' was selected in New Jersey and introduced in 1985. With its gracefully arching branches, it resembles American elm more closely than other cultivars, and grows rapidly.

Advantages: Can be used as a substitute for American elm, having similar leaves and graceful form, though the branches are more numerous and the size is not as majestic. It is highly resistant to Dutch elm disease, and no serious pest problems are known. Has good tolerance of urban and seacoast environments. Growth rate is faster than 'Village Green'.

Limitations: Availability limited in some regions. Can split at crotch because of narrow angle; susceptible to crotch cankers.

Site and Culture: Transplants readily in the spring; avoid planting in the fall. Adaptable to pH, compacted soil, pollution, partial shade, and drought once established. Young trees are susceptible to frost.

Notes:

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Municipal Tree Restoration Program, School of Forest Resources, Penn State University, University Park, PA 16802

Halka Japanese Zelkova

Keith Warren, J. Frank Schmidt & Son

Henry D. Gerhold,
Penn State University

Henry D. Gerhold, Penn State University

Village Green Japanese Zelkova

Ze se VG

Zelkova serrata **'Village Green'**
P.P. 2337, trademarked

Height: 50′ to 60′ (40′ at age 30)
Width: 50′ to 60′ (40′ at age 30)
Hardiness Zone: 5 to 8

Crown: broad and vase-shaped, medium-fine texture
Foliage: 1½″ to 2½″ leaves, dark green, turning rusty red in fall
Flowers: inconspicuous
Fruit: inconspicuous

Description: The species is native to Japan, Korea, and China. Typically it has ascending branches that form a vase-shaped crown, a short trunk, and bark that is smooth and gray when young, then flaky with small orange patches upon maturing. 'Village Green' was selected in New Jersey for its rapid growth, good form, attractive leaves, and Japanese beetle resistance, and was patented in 1964.

Advantages: Can be a substitute for American elm, having similar leaves and graceful form, though the branches are more numerous and the size is not as majestic. It is highly resistant to Dutch elm disease, and no serious pest problems are known. Has good tolerance of suburban and seacoast environments. The crown form is broader than that of 'Green Vase'.

Limitations: Can split at crotch because of narrow angle; susceptible to canker. Susceptible to elm leaf beetle.

Site and Culture: Easy to transplant, and adaptable to pH, compacted soil, pollution, partial shade, and drought once established. Avoid planting in the fall. Young trees are susceptible to frost.

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